Program for Master Postgraduate Studies of Molecular Biology

CONTENTS

Academic Reference Standards (ARS), NAQAAE (2009)

Academic reference standards (ARS) for Master postgraduate studies, NAQAAE, March 2009

1- Attributes of the graduate:

The graduate of Master program of any specialty must:

1.1. Master the basics of scientific research and methodologies using the different tools of molecular biology.
1.2. Apply and use the applications of analytical method in the field of interest.
1.3. Apply and integrate the relevant knowledge molecular biology in professional practice.
1.4. Demonstrate awareness of the ongoing specialty problems and modern visions in the field of molecular biology.
1.5. Identify and solve professional problems.
1.6. Master appropriate scale of professional skills, and use of suitable technological means to serve professional practice in molecular biology.
1.7. Communicate effectively and lead work teams.
1.8. Make decisions in different professional contexts.
1.9. Use available resources to achieve the highest benefit and preservation.
1.10. Participate efficiently in community development to global and regional changes.
1.11. Act with commitment to integrity, credibility and profession rules.
1.12. Dedicate to academic, professional self-development and continuous learning.

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of the study of Master program of any specialty, the graduate should have sufficient knowledge & understanding of:

2.1.1. Basic facts, theories, of the molecular biology and related fields.
2.1.2. Different effects of pathogens and environmental pollutions and their reflection on molecular biology of living organisms
2.1.3. Main scientific advances in the molecular biology field.
2.1.4. Ethical and legal regulations of profession the molecular biology researches.
2.1.5. Quality standards of the profession practice in the field of molecular biology.
2.1.6. Basics and ethics of molecular biology scientific research.

2.2 Intellectual skills:

By the end of the study of Master program of any specialty, the graduate should be able to do the following (related to the specialty):

2.2.1. Interpret, analyze & evaluate the information of molecular biology to solve problems.
2.2.2. Solve some problems that do not conform to classic data of molecular biology.
2.2.3. Integrate different information to solve professional problems in the molecular biology field.
2.2.4. Conduct a scientific research &/ or write scientific systematic approach to a molecular biology research problem (hypothesis).
2.2.5. Evaluate professional risks in the field of molecular biology.

2.2.6. Plan for professional improvement in the field of molecular biology.
2.2.7. Take professional decisions.

2.3. Professional:

By the end of the study of Master program of any specialty, the graduate must:

2.3.1. Competent in all basic and some of the advanced professional skills in the molecular biology fields.
2.3.2. Write and appraise reports
2.3.3. Evaluate methods and tools used in the field of molecular biology.

2.4. General & transferable skills:

By the end of the Master program in any specialty, the graduate will be able to:

2.4.1. Communicate effectively using all methods.
2.4.2. Use information technology to improve professional practice.
2.4.3. Practice self appraisal and determines learning needs.
2.4.4. Utilize different information sources to obtain data. Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)
2.4.5. Determine standards for evaluation of others (e.g.: subordinates/ trainees etc.)
2.4.6. Work in and lead a team in comparable work level.
2.4.7. Manage time effectively.
2.4.8. Learn independently.

Program Academic Reference Standards (ARS)

Academic Reference Standards of Molecular Biology Master Program

1- Attributes of the graduate:

The graduate of Master program of any specialty must:

1.1. Master the basics of scientific research and methodologies using different molecular biology tools.
1.2. Apply and use the applications of analytical method in the field of molecular biology.
1.3. Apply and integrate the relevant knowledge in specialized professional practice of molecular biology.
1.4. Demonstrate awareness of the ongoing specialty problems and modern visions.
1.5. Identify and solve professional problems.
1.6. Master appropriate scale of professional skills, and use of suitable technological means to serve professional practice.
1.7. Communicate effectively and lead work teams.
1.8. Make decisions in different professional contexts.
1.9. Use available resources to achieve the highest benefit and preservation.
1.10. Be aware of his/her role in community development and environmental conservation.
1.11. Act with commitment to integrity, credibility and profession rules.
1.12. Dedicate to academic, professional self-development and continuous learning.

2. Program Academic standards:

Adopted from the National Academic Reference Standards (ARS) for Master Program, approved by the molecular biology department and Institute Council.

3.1 Knowledge & Understanding

By the end of the study of Master program in molecular biology, the graduate should have sufficient knowledge & understanding of:

3.1.1 Recognize theories, basics of the molecular biology and related subjects.
3.1.2 Compare mutual effects between professional practice of molecular biology and effects on environment.
3.1.3 Main scientific advances of molecular biology practice.
3.1.4 Acknowledge ethical and legal fundamentals and their application in the field of molecular biology researches.
3.1.5 Apply quality principals in professional practice in the field of molecular biology.
3.1.6 Follows basics and ethics of scientific research in the field of molecular biology.

3.2 Intellectual Skills

By the end of the study of Master program in molecular biology, the graduate must be able to:

3.2.1 Interpret, analyze and evaluate the information to solve problems in the field of molecular biology.
3.2.2 Solve some problems based on available data regarding molecular biology.
3.2.3 Integrate different information to sources solve professional problems in the field of molecular biology.

3.2.4 Conduct a scientific research and/ or write scientific systematic approach to a research problem (hypothesis) in the field of molecular biology.
3.2.5 Evaluate professional risks of molecular biology.
3.2.6 Plan for professional improvement in the field molecular biology.
3.2.7 Take professional decisions based on molecular biology fields.

3.3. Practical and Professional skills

By the end of the study of Master program in molecular biology, the graduate must be able to:

3.3.1 Competent in all basic and some of the advanced professional skills in molecular biology fields.
3.3.2 Write and appraise reports about molecular biology.
3.3.3 Evaluate methods and tools used in molecular biology fields.

3.4. General & Transferable skills

By the end of Master Program in molecular biology, the graduate must be able to:

3.4.1 Communicate effectively using all methods.
3.4.2 Use information technology to improve professional practice.
3.4.3 Practice self-appraisal and determines learning needs.
3.4.4 Utilize different information sources to obtain data. Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)
3.4.5 Determine standards for evaluation of others (e.g.: subordinates/ trainees etc.)
3.4.6 Work in and lead a team in comparable work level.
3.4.7 Manage time effectively.
3.4.8 Learn independently

Matrix between Program Graduate Attributes and Graduate Attributes from NAQAAE

Program Graduate Attributes	Graduate Attributes from NAQAA											
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12
1.1	X											
1.2		X										
1.3			X									
1.4				X								
1.5					X							
1.6						X						
1.7							X					
1.8								X				
1.9									X			
1.10										X		
1.11											X	
1.12												X

Matrix between Program Academic Reference Standards and ARS from NAQAAE

2.1 Knowledge & Understanding

Program ARS	ARS NAQAAE					
	2.1.1	2.1.2	2.1.3	2.1.4	2.1.5	2.1.6
3.1.1	X					
3.1.2		X				
3.1.3			X			
3.1.4				X		
3.1.5					X	
3.1.6						

2.2. Intellectual Skills

Program ARS	ARS NAQAAE						
	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7
3.2.1	X						
3.2.2		X					
3.2.3			X				
3.2.4				X			
3.2.5					X		
3.2.6						X	
3.2.7							X

2.3.1 Professional Skills

Program ARS	ARS NAQAAE		
	2.3.1	2.3.2	2.3.3
3.3.1	X		
3.3.2		X	
3.3.3			X

2.3.2 General and Transferable skills

Program ARS	ARS NAQAAE							
	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.4.6	2.4.7	2.4.8
3.4.1	X							
3.4.2		X						
3.4.3			X					
3.4.4				X				
3.4.5					X			
3.4.6						X		
3.4.7							X	
3.4.8								X

Molecular Biology Master Program Specification (2015/2016)

Master Program Specification
(2015 / 2016)

A-Basic Information

1- **Program title**: **Molecular Biology Master**
2- **Program type**: Single √ Double multiple
3. **Department**: **Molecular Biology**
4. **Program coordinator: Prof. Dr. Kalied Bassiouny**
5. **Program approval date**: 19/09/2015

B-Professional Information

1. **Program aims**

Preparation of Master graduate capable of:

1/1 Preparing Master Graduate having capability of attaining the basics and applying novel methodologies of scientific research in the field of molecular biology.
1/2 Improving skills of the Master graduate in identifying molecular biology problems and using available resources to solve them and to achieve highest benefits.
1/3 Applying analytical methods and specialized knowledge and using appropriate technological means in biochemical and molecular biotechnology.
1/4 Demonstrating awareness of the ongoing problems in the surrounding environment.
1/5 Applying biotechnology knowledge and integrate it with professional skills to solve the molecular biology problems.
1/6 Developing academically and professionally the students' capabilities in molecular biology and the continuous learning ones.
1/7 Developing the ability to lead a working team and having the capability to make decisions in different professional contexts in molecular biology.
1/8 Acquiring the skills of effective communication, integrity and credibility commitment and the community development and molecular biology.
1/9 Expressing and differentiate between the genetic materials, and applying this in molecular diagnosis of the diseases.

2. Intended learning outcomes (ILOs):

2/1 Knowledge and understanding:

By the end of this program, the graduate must able to:

a- Describe basic facts, theories and the biotechnological applications use in the field of cellular biochemistry and molecular biology of cancer.
b – Express the attitudes and ethical basis in scientific research and in molecular (hematology, pathology, parasitology) and human cell biology applications of molecular pharmacology.
c – Classify main scientific advances of applying principles of quality assurance principles in molecular immunology (immunoprotien and immunoassays) applications on environmental diseases.
d – Recognize actual fundamental of good laboratory practice in the field of molecular biology diagnostics and molecular aspects of diseases.

e- Describe quality standards of the practice during the analysis and determination of molecular cancer biology& biochemistry by flow cytometry and approach of PCR techniques.

f- Summarize main basics and ethics of scientific researches of molecular genetics and cytogenetic of DNA repair mechanisms aspects of gene expression fields.

g. Write list of the basic rules and scientific terms of English language and computer of research methodology

2/2 Intellectual skills

By the end of this program, the graduate must able to:

a- Appoint suitable genetic engineering and molecular biology techniques in the different agricultural and medicinal research areas.

b- Plan experiments and methodologies for the determination of immune responses.

c- Compare between different techniques used in the assessment of molecular alterations during diseases.

d- Interpret different information to unravel the etiologies and suitable treatments for human diseases.

e- Compare between the different normal and abnormal patterns of genetic materials by using different molecular biology techniques.

f- Analyze scientific researches to solve the problems of the drug-DNA interaction and its application in controlling diseases.

g- Troubleshoot obstacles that arise during performing molecular biology techniques.

h- Plan paraphrasing English technical terms processes using in scientific researches.

2/3 Professional and Practical Skills:

By the end of this program, the graduate must able to:

a- Analyze the data from different experiments and to interpret them in the light of published work.

b- Evaluate tools used in evaluating the immune response to treatments and pathogens.

c- Execute and apply a range of practical approaches relevant to areas of molecular biology by Methods in molecular cancer biology, hematology and Practical approach in PCR.

d- Perform experiments to isolate chromosomes from different organisms karyotyping assays.

e- Evaluate techniques and tools during the experimental part of molecular biology fields research**.**

f- Perform different types techniques in genetic engineering and molecular biology.

g- Apply analytical methods for determination and analysis of experimental models of diseases to explore novel diagnostic and treatment approaches.

h- Monitor accurate observations and measurements of molecular techniques.

i- Prepare written reports of molecular biology techniques and risk assessment analyses and published research in specific journal and scientific essay**.**

2/4 General and transferable Skills:

By the end of this program, the graduate must able to:

a- Communicate effectively with public, collegeous and appropriate authorities.

b- Use information technology to improve his professional practice in internet and relative information.

c- Practice self evaluation and determines his learning needs.

d- Use different sources of information to obtain data for a given course topic.

e- Work in teams and manage time effectively.
f- Work as team leader in situation comparable to his level.
g- Learn independently and seek continuous learning in molecular biology.
h- Take professional decisions for suitable methods of biological waste management.
i- Manage time efficiently with other groups.

3- <u>Program Academic standards:</u>

Derived from the National Academic Reference Standards (ARS) for Master Program. Approved by the molecular biology Department and Institute Council.

4- Bench Marks: ARS

Adopted from ARS of master programs from NAQAA 2009 and approved by the department council.

5- Curriculum Structure and Contents:

a. Program duration: not exceed 2 years

b Program structure:

Lectures	33	Lab./ Exercise	18	Total	51
Compulsory	32	Optional	-----	Elective	19

	No.	%
▪ basic sciences courses	9	18
▪ Social sciences and humanity courses	3	6
▪ Specialized courses	36	70

	No.	%
▪ Other sciences courses	3	6

	No.	%
▪ Practical (Thesis)	The time spent in achievement of a thesis (8 hrs/week)	

b- Program Levels (in credit-hours system): Not Applicable

6. Program courses:

a- Compulsory (General Courses):

Code No.	Course Title	No. of Units (hrs)	No. of hours/week			Year/Level	Semester
			Lect.	Ex.	Lab/ App		
	English language	3	3	-		1	1
	Research and research methodology	6	3	-		1	1
A-23	Biotechnology I	3	3	-		1	2
A-80	Computer	3	2	2		1	2
B1-3	Advanced genetics	3	3	-		2	1
B1-94	Special topics	3	3	-		2	1
B1-95	Seminars	3	---	6		2	2
	Total	24	17	6			

b- Elective: Specialized courses (At least 4 courses from the listed below courses)

Code No.	Course Title	No. of Units	No. of hours/week			Year/Level	Semester
			Lect.	Ex.	App.		
A-16	Biochemistry of nucleic acids	3	3			1	1
A-27	Cellular Biochemistry	3	3			1	1
B1-7	Cellular and molecular biology of cancer	3	3			2	2
B1-9	Chromosomes	3	3			2	2
B1-11	DNA cloning	3	3			2	2
B1-12	DNA repair mechanisms	3	3			2	2
B1-17	Gene expression	3	3			2	2
B1-18	Gene probes	3	3			2	2

B1-25	Human genome	3	3			2	3
B1-28	Human cell biology	3	3			3	3
B1-31	Mitochondria	3	3				
B1-34	Molecular biology of eukaryotic cells	3	3			3	3
B1-35	Molecular biology	3	3			3	3
B1-39	Molecular biotechnology	3	3			1	3
B1-46	Molecular entomology	3	3			1	3
B1-48	Molecular genetic analysis of population	3	3			2	4
B1-52	Molecular hematology	3	3			2	4
B1-54	Molecular immunology	3	3			2	4
B1-56	Molecular parasitology	3	3			2	4
B1-58	Molecular pharmacology	3	3				
B1-60	Molecular plant pathology	3	3			1	4
B1-68	Oncogenies	3	3			1	4
B1-70	Physiological genetics	3	3				
B1-85	Structure and Function Relationship of Protein	3	3			1	4
B1-89	Vitamin metabolism	3	3				
C-36	Flow cytometry	3	2		2	2	4
C-44	Immunochemistry	3	2		2	2	4
C-63	Methods Immunology 11	3	2		2	2	4
C-68	Methods in molecular cancer biology	3	2		2	2	4
C-73	Methods in molecular hematology	3	2		2	2	4
C-101	Practical approach in PCR	3	2		2	2	3
B5-25	Immunoproteins (cytokines)	3	3			2	3
B7-23	Immunoassays	3	3			2	3

c- M.Sc. thesis

All MSc-degree students should prepare a thesis in Molecular Biology. The department and the ethical committees must approve the protocol of the research. The thesis should include a review part and a research part. The thesis is supervised by one or more senior staff members of the Molecular Biology Department and may include other specialties according to the nature of the research. The thesis should be evaluated and approved by a committee of three professors including one of the supervisors and an external professor.

7- Program admission requirements:

- Bachelor degree from appropriate practical faculty from Egyptian or an equivalent university with general grade (Acceptable) or Diploma in Biochemistry and Molecular Biology.

8- Regulations for progression and program completion:

Successful completion of the required courses (equivalent to at least 18 units' content 6 courses) in addition to compulsory courses: English language, Computer, Research and research methodology, special topics and Seminars.

- Student success in any course of study is estimated in one of the following estimates:

Excellent	From 90 to 100 degrees
Very Good	From 80 to less than 90 degrees
Good	From 70 to less than 80 degrees
Pass	From 60 to less than 70 degrees

- Approved completion of the research experiments.
- Approved scientific writing of M.Sc. thesis.
- Successfully passes of thesis open defense examination.

8- Assessment methods for Evaluating Program Applicants:

No.	Method	Intended Learning Outcomes ' ILO's '
1	Semester Works (5th to 10th)	Measure Problems Solving Skills, Presentation Data and Discussion, and Work on team. -Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills
2	Midterm Exam (6th) Week.	Measure Abilities on Concentration and understanding Scientific Points & Background. -Knowledge and Understanding and Intellectual Skills
3	Practical Exam (13th) Week.	-Measure Practices & Applications Skills and Professional & art Skills. -Professional and practical Skills & General and Transferable Skills
4	Oral Exam (14th) Week.	Measure Analysis, Presentation, and Discussion Skills. Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills
5	Written (Final) Exam (15th) Week.	Measure Remembering & Innovating Skills. -Knowledge and Understanding and Intellectual Skills
6	Thesis discussion	To assess the ability to write a review article, perform the needed practical steps and to present the results in tables and graphs.

		In addition, the skills of analysis of results and discussion with previous findings obtained by other authors are also assessed. -Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

Evaluator
Internal evaluator: Prof. Dr. Mohamed Elshal
External evaluator: Professor Dr.
Others methods

9- Program Evaluation methods:

No.	Evaluator	Tool	Sample
1	Senior students	Questionnaire	20
2	Alumni	Depth Meeting	5
3	Stakeholders (Employers)	Nucleus Meeting	5
4	External (Evaluators & Examiners)	Remarking Questionnaire & Nucleus Meeting	2
5	Others	Not Applied	---------

Program coordinator: Prof. Dr. Kalied Bassiouny

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix Between Program ILO's and Courses

Matrix of Knowledge and Skills ILOs for Program Courses of Molecular Biology Master

No.	Course No.	Course title	Knowledge and understanding						
			a	b	c	d	e	f	g
1		English language							X
2		Research and research methodology I							X
3	A-23	Biotechnology I	X						
4	A-80	Computer							X
5	B1-3	Advanced genetics						X	
6	B1-94	Special topics		X					
7	B1-95	Seminars						X	
8	**A-16**	Biochemistry of nucleic acids					X		
9	**A-27**	Cellular Biochemistry	X						
10	**B1-7**	Cellular and molecular biology of cancer	X						
11	**B1-9**	Chromosomes						X	
12	**B1-11**	DNA cloning	X						
13	**B1-12**	DNA repair mechanisms				X			
14	**B1-17**	Gene expression				X			
15	**B1-18**	Gene probes						X	
16	**B1-25**	Human genome	X						
17	**B1-28**	Human cell biology		X					
18	**B1-31**	Mitochondria						X	
19	**B1-34**	Molecular biology of eukaryotic cells				X			
20	**B1-35**	Molecular biology	X						
21	**B1-39**	Molecular biotechnology	X						
22	**B1-46**	Molecular entomology		X					
23	**B1-48**	Molecular genetic analysis of population						X	
24	**B1-52**	Molecular hematology		X					
25	**B1-54**	Molecular immunology							
26	**B1-56**	Molecular parasitology		X					
27	**B1-58**	Molecular pharmacology		X					
28	**B1-60**	Molecular plant pathology							
29	**B1-68**	Oncogenes	X						
30	**B1-70**	Physiological genetics				X			
31	**B1-85**	Structure and Function Relationship of Protein			X				
32	**B1-89**	Vitamin metabolism							
33	**C-36**	Flow cytometry							
34	**C-44**	Immunochemistry							
35	**C-63**	Methods Immunology 11			X				
36	**C-68**	Methods in molecular cancer biology	X						
37	**C-73**	Methods in molecular hematology					X		
38	**C-101**	Practical approach in PCR					X		
39	**B5-25**	Immunoproteins (cytokines)			X				
40	**B7-23**	Immunoassays			X				
MSc Thesis			X	X	X	X	X	X	X

No.	Course No.	Course title	Intellectual skills							
			a	b	c	d	e	f	g	h
1		English language								X
2		Research and research methodology I	X							
3	A-23	Biotechnology I				X				
4	A-80	Computer						X		
5	B1-3	Advanced genetics	X							
6	B1-94	Special topics							X	
7	B1-95	Seminars					X			
8	**A-16**	Biochemistry of nucleic acids			X					
9	**A-27**	Cellular Biochemistry							X	
10	**B1-7**	Cellular and molecular biology of cancer				X				
11	**B1-9**	Chromosomes					X			
12	**B1-11**	DNA cloning						X		
13	**B1-12**	DNA repair mechanisms					X			
14	**B1-17**	Gene expression				X				
15	**B1-18**	Gene probes					X			
16	**B1-25**	Human genome							X	
17	**B1-28**	Human cell biology				X				
18	**B1-31**	Mitochondria				X				
19	**B1-34**	Molecular biology of eukaryotic cells					X			
20	**B1-35**	Molecular biology				X				X
21	**B1-39**	Molecular biotechnology	X							
22	**B1-46**	Molecular entomology				X				
23	**B1-48**	Molecular genetic analysis of population	X							
24	**B1-52**	Molecular hematology					X			
25	**B1-54**	Molecular immunology			X					X
26	**B1-56**	Molecular parasitology				X				
27	**B1-58**	Molecular pharmacology					X			
28	**B1-60**	Molecular plant pathology							X	
29	**B1-68**	Oncogenes			X					
30	**B1-70**	Physiological genetics	X							
31	**B1-85**	Structure and Function Relationship of Protein				X				
32	**B1-89**	Vitamin metabolism					X			
33	**C-36**	Flow cytometry				X				
34	**C-44**	Immunochemistry		X						
35	**C-63**	Methods Immunology 11					X			
36	**C-68**	Methods in molecular cancer biology						X		
37	**C-73**	Methods in molecular hematology							X	
38	**C-101**	Practical approach in PCR	X							X
39	**B5-25**	Immunoproteins (cytokines)		X						
40	**B7-23**	Immunoassays		X						
MSc Thesis			X	X	X	X	X	X	X	X

No.	Course No.	Course title	Professional and Practical Skills							
			a	b	c	d	e	f	g	H
1		English language								X
2		Research and research methodology I				X				
3	A-23	Biotechnology I								X
4	A-80	Computer						X		
5	B1-3	Advanced genetics	X							
6	B1-94	Special topics					X			
7	B1-95	Seminars							X	
8	**A-16**	Biochemistry of nucleic acids				X				
9	**A-27**	Cellular Biochemistry					X			
10	**B1-7**	Cellular and molecular biology of cancer		X						
11	**B1-9**	Chromosomes	X							
12	**B1-11**	DNA cloning			X					
13	**B1-12**	DNA repair mechanisms		X						
14	**B1-17**	Gene expression					X			
15	**B1-18**	Gene probes						X		
16	**B1-25**	Human genome		X						
17	**B1-28**	Human cell biology					X			
18	**B1-31**	Mitochondria	X							
19	**B1-34**	Molecular biology of eukaryotic cells			X					
20	**B1-35**	Molecular biology								X
21	**B1-39**	Molecular biotechnology							X	
22	**B1-46**	Molecular entomology								X
23	**B1-48**	Molecular genetic analysis of population	X							
24	**B1-52**	Molecular hematology		X						
25	**B1-54**	Molecular immunology								X
26	**B1-56**	Molecular parasitology			X					
27	**B1-58**	Molecular pharmacology						X		
28	**B1-60**	Molecular plant pathology	X							
29	**B1-68**	Oncogenies								
30	**B1-70**	Physiological genetics				X				
31	**B1-85**	Structure and Function Relationship of Protein								X
32	**B1-89**	Vitamin metabolism				X				
33	**C-36**	Flow cytometry								X
34	**C-44**	Immunochemistry					X			
35	**C-63**	Methods Immunology 11						X		
36	**C-68**	Methods in molecular cancer biology		X						
37	**C-73**	Methods in molecular hematology						X		
38	**C-101**	Practical approach in PCR							X	
39	**B5-25**	Immunoproteins (cytokines)				X				
40	**B7-23**	Immunoassays								X
MSc Thesis			X	X	X	X	X	X	X	X

No.	Course No.	Course title	General and transferable Skills								
			a	b	c	d	e	f	g	h	i
1		English language				X					
2		Research and research methodology I								X	
3	A-23	Biotechnology I									X
4	A-80	Computer			X						
5	B1-3	Advanced genetics	X								
6	B1-94	Special topics								X	
7	B1-95	Seminars						X			
8	**A-16**	Biochemistry of nucleic acids				X					
9	**A-27**	Cellular Biochemistry						X			
10	**B1-7**	Cellular and molecular biology of cancer									X
11	**B1-9**	Chromosomes							X		
12	**B1-11**	DNA cloning		X							
13	**B1-12**	DNA repair mechanisms	X								
14	**B1-17**	Gene expression			X						
15	**B1-18**	Gene probes								X	
16	**B1-25**	Human genome	X								
17	**B1-28**	Human cell biology							X		
18	**B1-31**	Mitochondria								X	
19	**B1-34**	Molecular biology of eukaryotic cells						X			
20	**B1-35**	Molecular biology					X				
21	**B1-39**	Molecular biotechnology				X					
22	**B1-46**	Molecular entomology		X							
23	**B1-48**	Molecular genetic analysis of population					X				
24	**B1-52**	Molecular hematology			X						
25	**B1-54**	Molecular immunology	X								
26	**B1-56**	Molecular parasitology				X					
27	**B1-58**	Molecular pharmacology		X							
28	**B1-60**	Molecular plant pathology			X						
29	**B1-68**	Oncogenies									X
30	**B1-70**	Physiological genetics							X		
31	**B1-85**	Structure and Function Relationship of Protein								X	
32	**B1-89**	Vitamin metabolism		X							
33	**C-36**	Flow cytometry				X					
34	**C-44**	Immunochemistry	X								
35	**C-63**	Methods Immunology 11			X						
36	**C-68**	Methods in molecular cancer biology		X							
37	**C-73**	Methods in molecular hematology									X
38	**C-101**	Practical approach in PCR								X	

No.	Course	Course title	General and transferable Skills								
39	**B5-25**	Immunoproteins (cytokines)				X					
40	**B7-23**	Immunoassays									X
MSc Thesis			X	X	X	X	X	X	X	X	X

Program coordinator: Prof. Dr. Kalied Bassiouny
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix Between Program ARS and Program ILO's

The matrix between ARS and Master Program ILO's

2/1 (Knowledge & Understanding)

Program ARS (Knowledge & Understanding)	Program ILO's (Knowledge & Understanding)					
	2/1.1	2/1.2	2/1.3	2/1.4	2/1.5	2/1.6
3.1.1	X					
3.1.2		X				
3.1.3			X			
3.1.4				X		
3.1.5					X	
3.1.6						X

2/2 Intellectual Skills

Program ARS (Intellectual Skills)	Program ILO's (Intellectual Skills)						
	2/2.1	2/2.2	2/2.3	2/2.4	2/2.5	2/2.6	2/2.7
3.2.1	X						
3.2.2		X					
3.2.3			X				
3.2.4				X			
3.2.5					X		
3.2.6						X	
3.2.7							X

2/3 (Practical and professional Skills)

Program ARS (Practical and professional Skills)	Program ILO's (Practical and professional Skills)		
	2/3.1	2/3.2	2/3.2
3.3.1	X		
3.3.2		X	
3.3.3			X

2/4 (General and Transferable skills)

Program ARS (General and Transferable skills)	Program ILO 's (General and Transferable skills)							
	2/4.1	2/4.2	2/4.3	2/4.4	2/4.5	2/4.6	2/4.7	2.4.8
3.4.1	X							
3.4.2		X						
3.4.3			X					
3.4.4				X				
3.4.5					X			
3.4. 6.						X		
3.4.7							X	
3.4.8								X

Program coordinator: Prof. Dr. Kalied Bassiouny
Head of Department: Prof. Dr. Ibrahim Helmy

Courses specification

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-3**	**Course Title:**	Advanced Genetics				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identifying the DNA sequence of those mutated genes, studying the functions of the encoded proteins, determining sets of genes that interact on a molecular basis, and dozens of other fascinating aspects of modern genetics 2/2- Developing describes the central dogma of advanced genetic. 2/3- Demonstrating awareness different between the genetic materials and applying this in molecular biology. 2/4- Expressing the attitudes and ethical basis in scientific research and in advanced genetic. 2/5- Classifying main scientific advances of using the quality assurance principles in molecular advanced genetic.

3. Intended Learning Outcomes of Course (ILO's)	
a. Knowledge and Understanding:	1- Express the attitudes and ethical basis in scientific /a research and in molecular biology application of advanced genetics. Summarize actual fundamental of ethical and legal 2-/a practice in the field of central dogma. a/3 - Write list of the basic rules and scientific terms of English language of program cell death. a/4- Classify main scientific advances of using the quality assurance principles in regulation cell cycle in eukaryotic cell.
b. Intellectual skills:	1- Compare between the different normal and abnormal /b patterns of genetic materials by using different molecular biology techniques 2- Appoint suitable methods for different advanced genetics /b with the cell signaling. 3- Derive different between methods program cell death. /b 4- Plan the identification recent specific and sensitive /b

	assays for evaluation of central dogma.
c. Practical and Professional Skills of course:	**Not Applicable (N/A)**
d. General and Transferable Skills	1- Communicate effectively using all methods with /d public, collegeous and appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given advanced genetics course topics. d/5- Work in teams and capable to Manage time effectively d/6- Manage time effectively. d/7- Work as team leader in situation comparable to his/her level. d/8- Learn independently and seek continuous learning in advanced genetics.

	4. Course Contents:
No.	**Topic**
1	modified structure DNA & RNA
2	Central dogma
3	prokaryotic Gene replication & Transcription & translation
4	Genomics and Proteomics
5	Reverse genetics
6	Relationships between cell cycle and cancer
7	Program cell death

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
a. Assessment Methods:	-Semester Works -Midterm Exam

	-Oral Exam - Written (Final) Exam
b. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
c. Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	
a. Notes	
b. Essential Books (Text Books)	1- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 2- Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. 3- De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. **4-** Bower JM, Bolouri H (Eds.)(2001). Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press,
c. Suggested Books	1- Molecular Biology of the Cell, 4^{th} edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010. 2- Molecular Cell Biology, 5^{th} edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell. W.H. Freeman & Co., 2011. 3- Genes VIIII. Lewin. Prentice Hall, 2011

4- Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal

Course Name	**Advanced Genetics**
Course Code	**B1-3**

Course coordinator: Prof. Dr. Amal Ahmed Abd El- Aziz.
Dr. Aism Faied
Head of the department council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Advanced Genetics Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
modified structure DNA & RNA	**1&2**	**a/1, a/2**	**b/1, b/2**	**N/A**	**d/1, d/4**
Central dogma	**3&4**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/2, d/4**
prokaryotic Gene replication & Transcription & translation	**5&6**	**a/1, a/4**	**b/1, b/4**	**N/A**	**d/1, d/3, d/5**
Genomics and Proteomics	**7&8**	**a/1, a/3**	**b/1, b/2**	**N/A**	**d/1, d/3, d/6**
Reverse genetics	**9&10**	**a/1, a/3, a/4**	**b/1, b/3**	**N/A**	**d/1, d/2, d/6**
Relationships between cell cycle and cancer	**11&12**	**a/1, a/3**	**b/1, b/3**	**N/A**	**d/1, d/2, d/8**
Program cell death	**13&14**	**a/1, a/3. a/4**	**b/1, b/2, b/4**	**N/A**	**d/1, d/4, d/7**

Course coordinator: Prof. Dr. Amal Ahmed Abd El- Aziz.
Dr. Aism Faied
Head of Department: Prof. Dr. Ibrahim H. El Seid

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	A-16	**Course Title:**	Biochemistry of Nucleic Acid				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Developing the ability to lead a working team and having the capability to make decisions in different professional contexts in molecular biology (biochemistry of nucleic acid). **2/2-** Expressing the molecular basis of replication, transcription and translation. **2/3-** Classifying these processes and their regulation and applications. **2/4-** Describing basic properties of complex eukaryotic genomes.

3. Intended Learning Outcomes of Course (ILO's)	
e. Knowledge and Understanding:	a/1- Describe quality standards of the practice during the analysis and determination of molecular biology (Biochemistry of Nucleic Acid). a/2- Summarize the principles of DNA and chromatin structure, DNA repair and imprinting. 3- Summarize the complexity of eukaryotic genomes and /a its application. a/4 - Express the basic concepts of regulation of genetic information. a/5- Divide types of RNA and their structure function.
f. Intellectual skills:	b/1- Compare between the different normal and abnormal patterns of genetic materials by using different molecular biology techniques. b/2- Analyze the information about the types of RNA. 3- Interpret the structure and function of nucleic acids. /b 4- Explain and discuss the results of molecular genetic /b assays and solving problems.
g. Practical and Professional Skills of course:	**Not Applicable (N/A)**

h. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice of biochemistry course. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Nucleic acid and chromatin structure
2	DNA repair, DNA methylation, imprinting and mutation
3	Complexity of eukaryotic genomes and its applications
4	Expression of genomic information
5	Regulation of transcription and transcription factors
6	RNA synthesis and processing
7	Nucleic acids applications

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
d. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
e. Assessment Schedule	- Oral Exam - Mid-Term - Assignments

	- Final Exam.
f. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	-
10. Essential Books (Text Books)	-The Cell- A Molecular approach by Moore 2009 -Lewin B. (2006). Essential Genes. Published by Pearson Education, Inc. USA. (2006). -Deutsch A (Ed.) (2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256.
11. Suggested Books	- Molecular Biology of the Cell, 4th edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010
5- Periodicals, Web Sites, … etc ...	http://themedicalbiochemistrypage.org

Course coordinator: Prof. Mohamed Osman
Dr. Manal El Hamshary
Head of the department council: prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Biochemistry of Nucleic Acid Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
DNA/RNA & chromatin structure	**1&2**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/2, d/4**
Replication and DNA repair	**3&4**	**a/2, a/4**	**b/2, b/3**	**N/A**	**d/1, d/3**
Complexity of eukaryotic genomes and applications	**5&6**	**a/3, a/4**	**b/2, b/4**	**N/A**	**d/1, d/4**
Expression of genomic information	**7&8**	**a/1, a/3**	**b/4**	**N/A**	**d/1, d/3, d/4**
Transcription , regulation and transcription factors	**9&10**	**a/1, a/3, a/4**	**b/1, b/4**	**N/A**	**d/1, d/5, d/6**
Defects in lipids and DNA	**11&12**	**a/3, a/4**	**b/1, b/4**	**N/A**	**d/1, d/4, d/5**
New trends for treatment of metabolic diseases	**13&14**	**a/4. a/5**	**b/4, b/4**	**N/A**	**d/1, d/5, d/6**

Course coordinator: Prof. Mohamed Osman
Dr. Manal El Hamshary
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**A-27**	**Course Title:**	**Cellular biochemistry**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Applying transferable and general skills in the field of biochemistry and molecular biology via accomplishment of scientific workshop, meeting and seminars in molecular cell biology. **2/2-** Understanding the basic theories of biochemistry and cell biology. **2/3-** Relating between the structure and function of the eukaryotic cell. **2/4-** Understanding the cell/cell communication where are key elements in the development of the great range of multi-cellular organisms **2/5-** Listing basic information of the complex processes of life to the underlying molecular events. 2/6 Developing academically and professionally the students' capabilities of cellular biochemistry research.

3. Intended Learning Outcomes of Course (ILO's)	
i. Knowledge and Understanding:	1 Summarize main basics and ethics of scientific /a researches of cellular biochemistry. a/2 Express actual fundamental of ethical and legal practice in the of chemical structure, base composition, structures and biochemistry. 3 Classify different between pathways and signaling by /a mechanism cellular biochemistry. a/4 Describe the biotechnology use in molecular biology diagnosis and cell membrane transport.
j. Intellectual skills:	1 Plan the identification recent specific and sensitive /b assays for evaluation of immune response by cellular biochemistry. 2 Interpret the drug-DNA interaction and its application in /b

	controlling diseases. 3 Analyze the results between cell cycle and DNA /b replication 4 Compare between the parameters of cellular /b biochemistry with the parameters of different biological sciences.
k. Practical and Professional Skills of course:	Not Applicable (N/A)
l. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice of biochemistry course. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Structure and function of the cell.
2	Parts of the prokaryotic & eukaryotic cell.
3	Chemical structure of the cell.
4	Cell membrane transport.
5	Lipid structure, the cell membrane & membrane proteins
6	Nucleic acids types, structure and function.
7	The cell cycle and DNA replication.

5. Teaching and Learning Methods	
	Lectures Class activities Discussion Presentation Reports

6. Teaching and Learning Methods (for students with special needs)	Not applicable

7. Student Assessment:	
g. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
h. Assessment Schedule	- Oral Exam - Mid-Term - Assignments - Final Exam.
i. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	Clinical Chemistry: Principles, Procedures, Correlations by Michael L. Bishop, Edward P. Fody, Larry E. Schoeff Publisher: Lippincott Williams & Wilkins; 5th edition (July 6, 2004) ISBN: 0781746116.
11. Suggested Books	Text book of Biochemistry (2010).
12. Periodicals, Web Sites, … etc ...	Journal of Biological Chemistry(JBC). www.biochemistryonline.com

Course coordinator: Prof. Dr. Ibrahim Helmy
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Cellular Biochemistry Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
1- Structure and function of the cell	1&2	a/1, a/2	b/1	N/A	d/2
2- Parts of the prokaryotic & eukaryotic cell	3&4	a/1, a/3	b/1	N/A	d/1, d/4
3- Chemical structure of the cell	5&6	a/1, a/2, a/3	b/1	N/A	d/1, d/2, d/5
4- Cell membrane transport	7&8	a/2, a/4	b/1, b/2	N/A	d/1, d/3
5- Lipid structure, the cell membrane & membrane proteins	9&10	a/1, a/2	b/3	N/A	d/1, d/3, d/4
6- Nucleic acids types, structure and function	11&12	a/1, a/4	b/4	N/A	d/1, d/5, d/6
7- The cell cycle and DNA replication	13&14	a/1, a/2	b/1, b/4	N/A	d/1, d/7

Course coordinator: Prof. Dr. Ibrahim Helmy
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-9**	**Course Title:**	Chromosomes				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Expressing and differentiate between the chromosome sequences, and applying this in molecular diagnosis of the diseases. 2/2-Comparing between prokaryotic and eukaryotic chromosomes 2/3-Interpreting chromosomes mutation and how they arise, their detection and Analyze their risks of occurrence 2/4- Applying concepts of gene frequency analysis 2/5-Executing laboratory tests and techniques dealing with chromosomes, chromosomes banding and make karyotype.

3. Intended Learning Outcomes of Course (ILO's)	
m. Knowledge and Understanding:	Describe basic facts and theories of the gene frequency a/1- use in molecular biology diagnosis control of certain diseases. a/2- Summarize the biological terms: diploid, haploid, and crossover. a/3- Classify the molecular alterations in cells and tissues to understand arising and development of diseases like cancer and viral infections a/4- Divide the various forces that result in evolutionary changes through time.
n. Intellectual skills:	b/1- Compare between the different normal and mutation patterns of chromosomes eukaryote by using different molecular biology techniques. b/2- Interpret the parameters of molecular biology with the parameters of different biological sciences. b/3- Derive the relationship between the pollution and some diseases
o. Practical and Professional Skills of course:	c/1- Diagnose the chromosomes of different organisms in Eurokaryotic

	c/2-Analysis experimental models of different diseases diagnose for study. c/3- Write the report of gene frequency in chromosomes structure. c/4- Interpret and discuss results and determine their strength and validity in human chromosomes diseases.
p. General and Transferable Skills	1- Use Audio & Video Means For Displaying structure /d and distribution of prokaryotic and Eurokaryotic chromosomes.___ d/2- Learn independently and seek continuous learning in molecular biology of chromosomes sequence. d/3- Use different sources of information to obtain data for a given course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively & work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	**Introduction to cell division and genetics and Why we study chromosomes.**
2	**Cell cycle and mitosis, Meiosis I and Meiosis II.**
3	**Prokaryotic and Eurokaryotic chromosomes.**
4	**Human Karyotiping and Giant chromosomes.**
5	**Chromosome sequences.**
6	**Chromosome mutation**
7	**Gene frequency in chromosomes structure.**

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
j. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
k. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
l. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

Course Name	**Chromosomes**
Course Code	**B1-9**

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	- Cell Biology -A laboratory handbook 2006, by: Celies E (ed). Elsevier Academic Press. ISBN: 0-12-164731-5 - Chromosomes: Organization and function, 2003. by: Adrian T. Sumner. Blackwell Publishing ISBN: 0-632-05407-7.
a. Suggested Books	-Analyzing Chromosomes (basics from background to bench), 2010. By: B. Czepulkowski. (Author and ed). Springer. ISBN: 13-978-0387916095-0387916091 -Human Chromosomes (manual of basic techniques), 2009. By Ram S. Verma and Arvind Babu Pergamon press. ISBN: 0-08-035774-1
d -Periodicals, Web Sites, … etc ...	http/ www.protochol-online.org http/ www.accessexcellence. Org/RC/VL//GG http/ www.ornl.org/ sci/ techresources http/learn.genetics.utah.edu.

Course coordinator: Prof.Dr. Kalil Halfawy
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Chromosomes Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction to cell division and genetics and Why we study chromosomes.	1&2	a/4	b/3	c/3	d/1,d/2
Cell cycle and mitosis, Meiosis I and Meiosis II.	3&4	a/2	b/3	c/3	d/3,d/2
Prokaryotic and Eurokaryotic chromosomes.	5&6	a/4,a/2	b/2	c/1,c/2	d/2,d/3
Human Karyotype and Giant chromosomes.	7&8	a1,a/3	b/1	c/1,c/4	d/2,d/4
Chromosome mapping.	9&10	a/2	b/3	c/1,c/2	d/2,d/5
Chromosome abnormalities: -- Changes in chromosomes number	11&12	a/1,a/4	b/3	c/1,c/3	d/2,d/4
-Changes in chromosomes structure.	13&14	a/1,a/4	b/1, b/2	c/2,c/4	d/2,d/4,d/5

Course coordinator: Prof.Dr. Kalil Halfawy
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-11**	**Course Title:**	**DNA Cloning**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1. Demonstrating the basic concepts of genetic engineering applications. 2/2. Recognizing analytical methods & specialized knowledge and using appropriate technological means in molecular biotechnology of DNA cloning. 2/3. Applying biotechnology knowledge and integrate it with professional skills to solve the molecular biology problems in DNA cloning. 2/4. Developing the ability to lead a working team and having the capability to make decisions in different professional contexts in DNA cloning.

3. Intended Learning Outcomes of Course (ILO's)	
q. Knowledge and Understanding:	a/1- Express the attitudes and ethical basis in scientific research and in DNA cloning applications. 2 Describe basic facts and theories of the biotechnology / a use in DNA cloning. a/3 - Divide the theories, methodologies and ethics of scientific research restriction enzymes and ligases. a/4- Summarize actual fundamental of ethical and legal practice in application of genetic engineering. a/5- Classify the types of vectors for prokaryotic and eukaryotic cell.
r. Intellectual skills:	b/1- Appoint suitable methods for different genetic engineering of gene therapy and medicine. 2- Compare the methods for different advanced /b transformation technologies. 3- Analyze scientific researches to solve the problems of /b the genetic engineering applications. 4- Plan the identification recent specific and sensitive /b

	assays of types of vectors to benefit from it in taking conclusion. b/5- Interpret different information to solve the problems of develop the performance in the applications of DNA cloning.
s. Practical and Professional Skills of course:	1- Form Quality written reports of DNA cloning analysis /c and risk assessment using English language in applications of recombinant DNA techniques. c/2- Enhancement of oral and written communication skills. c/3- Development of critical thinking and creativity in scientific research
t. General and Transferable Skills	1- Communicate effectively using all methods with /d public, collegeous and appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given DNA cloning course topics. d/5- Work in teams and capable to Manage time effectively. d/6- Work as team leader in situation comparable to his level. d/7- Learn independently and seek continuous learning in molecular biology of DNA cloning.

	4. Course Contents:
No.	**Topic**
1	Types of Manipulative enzymes
2	Types of vectors for prokaryotic
3	Types vectors for Eukaryotes
4	Restriction enzymes and ligases of DNA
5	Transformation blotting techniques
6	Plasmid prep gel RT-P|CR & DNA sequencing
7	Applications of DNA cloning in genetics engineering

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
m. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
n. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
o. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	1-Brown T.A.(2006). Gene cloning and DNA analysis.Library of Congress-in- Publication Data 2-Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 3-Deutsch A (Ed.) Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), August 2003. ISBN 3764369256.
11. Suggested Books	6- Molecular cloning, 5^{th} edition. Brown Co., 2010. 7- Genes VIIII. Lewin. Prentice Hall, 2011
8- Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. a- www.prancipal genetics.

Matrix of Knowledge, Skills ILOs for DNA Cloning Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Types of Manipulative enzymes	**1&2**	**a/1, a/3**	**b/1, b/4**	**c/1**	**d/1, d/4**
Types of vectors for prokaryotic	**3&4**	**a/4, a/5**	**b/1,b/4**	**c/1**	**d/2, d/4**
Types vectors for Eukaryotes	**5&6**	**a/4, a/5**	**b/4**	**c/1, c/2**	**d/1, d/3**
Restriction enzymes and ligases of DNA	**7&8**	**a/1, a/2**	**b/1**	**c/2&c/3**	**d/2, d/6**
Transformation blotting techniques	**9&10**	**a/1, a/4**	**b/3, b/5**	**c/2, c/3**	**d/2, d/6**
Plasmid prep gel RT-P|CR & DNA sequencing	**11&12**	**a/2, a/4**	**b/4, b/5**	**c/3**	**d/3, d/7**
Applications of DNA cloning in genetics engineering	**13&14**	**a/1, a/2**	**b/1, b/2, b/3**	**c/3**	**d/1, d/4, d/7**

Course coordinator: Prof. Dr. Amal Abd El-Aziz
Dr. Nasser Hussein Abbas
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-12**	**Course Title:**	**DNA repair mechanisms**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Improving skills of the Master graduate in identifying molecular biology problems and using available resources to solve them & to achieve highest benefits. 2/2-Providing in-depth consideration of agents that alter DNA directly or indirectly through effects on its synthesis. 2/3- Classifying the mechanisms and repair processes through which cells respond to this damage. 2/4- Developing fundamental concepts DNA damage responses controlling decision points between DNA repair and apoptosis are considered.

3. Intended Learning Outcomes of Course (ILO's)	
u. Knowledge and Understanding:	a/1- Express the attitudes and ethical basis in scientific research and in molecular biology applications. a/2- Describe quality standards of the practice during the analysis and determination of genome sequencing approaches & copy number variation. a/3- Summarize main basics and ethics of scientific researches of gene therapies. a/4- Write list of the basic rules and scientific terms of English language of genome instability, mutate phenotypes and transient hyper mutability area.
v. Intellectual skills:	1- Compare between different methods of molecular /b alterations and induced diseases. 2- Interpret different information to solve the problems of /b develop the performance in the applications of gene therapy. 3- Compare between the different genetic evolution of /b cancer. b/4- Analyze scientific researches to solve the problems of the drug-DNA interaction and its application in controlling diseases.
w. Practical and Professional	Not Applicable (N/A)

Skills of course:	
x. General and Transferable Skills	1- Communicate effectively with public, collegeous and /d appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given DNA rapier course topics. d/5- Work in teams and capable to Manage time effectively . d/6- Work as team leader in situation comparable to his level. d/7- Learn independently and seek continuous learning in molecular biology of DNA rapier.

	4. Course Contents:
No.	**Topic**
1	Genome sequencing approaches & Copy Number Variation
2	Endangered Species Genomes & Mitochondrial DNA Mutations
3	Genome origin and evolution
4	Gene Therapies
5	Genome instability, Mutator Phenotypes & Transient Hypermutability
6	Genetic evolution of Cancer
7	Molecular techniques for analysis of DNA organization, mutation and repair

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
p. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam

q. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
r. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	**Biology 2581b text:** Genetics: from Genes to Genomes Hartwell et al.; Jones and Barlett Publishers; Copies are on reserve in the Taylor Library
11. Suggested Books	**Genes X** is on reserve in the Taylor libraray (2 hour loan): **Genes X** Benjamin Lewin ©2011 Jones and Bartlett Publishers You may preview the text at this website: http://www.jblearning.com/catalog/9780763766320/ **Genes IX** is on reserve in the Taylor library (2 hour loan) Previous editions of Genes are in the Taylor library (2 hour loan)
12. Periodicals, Web Sites, … etc ...	**Genomes** available *online*: http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=genomes **Comparative Genomics** *online*: http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=comgen

Course coordinator: **Prof. Dr. Mohamed El- Shahat**
Dr. Aism Fayed

Head of the department council: Prof. Dr. Ibrahim Helmy.

Matrix of Knowledge, Skills ILOs for DNA repair mechanisms Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Genome sequencing approaches & Copy Number Variation	**1&2**	**a/1,a/2**	**b/1, b/3**	**N/A**	**d/1, d/2, d/4**
Endangered Species Genomes & Mitochondrial DNA Mutations	**3&4**	**a/1,a/2**	**b/1, b/3**	**N/A**	**d/1, d/3, d/5**
Genome origin and evolution	**5&6**	**a/1,a/2**	**b/2, b/4**	**N/A**	**d/1, d/4**
Gene Therapies	**7&8**	**a/2, a/3**	**b/2**	**N/A**	**d/1, d/3, d/6**
Genome instability, Mutator Phenotypes & Transient Hypermutability	**9&10**	**a/1,a/2**	**b/2, b/3**	**N/A**	**d/1, d/7**
Genetic evolution of Cancer	**11&12**	**a/1,a/3**	**b/2, b/4**	**N/A**	**d/1, d/5**
Molecular techniques for analysis of DNA organization, mutation and repair	**13&14**	**a/1,a/2,a/4**	**b/2, b/3**	**N/A**	**d/1, d/3, d/7**

Course coordinator: **Prof. Dr. Mohamed El- Shahat**
Dr. Aism Fayed

Head of the department: **Prof. Dr. Ibrahim Helmy**

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-17**	**Course Title:**	**Gene expression**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identify the gene expression is the process by which information from a gene is used in the synthesis of a functional gene product often proteins 2/2- Linking between functions of specific gene products 2/3- Differentiating between the genetic materials, and applying in advances that reveal fundamental features of gene regulation during cell growth and differentiation 2/4- Be acquainted with the basics in scientific research and in Gene expression of prokaryotic and eukaryotic cells. 2/5- Memorizing the basic scientific terminology regarding the field of genetics.

3. Intended Learning Outcomes of Course (ILO's)	
y. Knowledge and Understanding:	1- Recall main scientific advances of using the quality /a assurance principles in molecular biology applications on environmental diseases of gene expression. Summarize actual fundamental of ethical and legal 2-/a practice in the field of Post-transcriptional Regulation of Gene Expression. a/3 - Write list of the basic rules and scientific terms of English language of Signal Transduction. a/4- Recognize main scientific advances of using the quality assurance principles in Control of gene expression (prokaryotes & eukaryotic).
z. Intellectual skills:	1- Compare between different methods of gene expression r/b alterations and induced diseases 2- Appoint suitable methods for different gene expression /b with the Signal Transduction. 3- Compare between different methods analyzing of gene /b expression (prokaryotes & eukaryotic).

	4- Plan the identification Transcriptional Regulation of /b Gene Expression.
aa. Practical and Professional Skills of course:	1- Analysis the data from your own and other people's /c experiments and to interpret them in the light of published work. c/2- Execute and Appling a range of practical skills relevant to your chosen areas of gene expression. c/3 Organization and background discussion about Control of gene expression in Eukaryotes c/4 - Prepare written reports of signal transduction analysis and risk assessment using English language.
bb. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying gene expression. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	From gene to protein: The genetic code and protein structure
2	Analyzing gene expression – Proteins
3	Post-transcriptional Regulation of Gene Expression
4	Transcriptional Regulation of Gene Expression
5	Signal Transduction
6	Control of gene expression (prokaryotes), The lac operon & The trp operon.
7	Control of gene expression (Eukaryotes)

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
s. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
t. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
u. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	5- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 6- Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. 7- De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. **8-** Bower JM, Bolouri H (Eds.)(2001). Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press,
11. Suggested Books	12. Molecular Biology of the Cell, 4^{th} edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010. 13. Molecular Cell Biology, 5^{th} edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell.

	W.H. Freeman & Co., 2011. 14. Genes VIIII. Lewin. Prentice Hall, 2011
15. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal

Course coordinator: Prof. Dr. Adal Guirgius
Dr. Alaa Saad Abo El Hakar

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Gene expression Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
From gene to protein: The genetic code and protein structure	**1&2**	**a/1**	**b/1, b/4**	**c/1, c/2**	**d/1, d/4**
Analyzing gene expression – Proteins	**3&4**	**a/1**	**b/4**	**c/1, c/2**	**d/1, d/2, d/4**
Post-transcriptional Regulation of Gene Expression	**5&6**	**a/1, a/2**	**b/4**	**c/1, c/4**	**d/1, d/3, d/5**
Transcriptional Regulation of Gene Expression	**7&8**	**a/1, a/2**	**b/3**	**c/1, c/3**	**d/1, d/3, d/6**
Signal Transduction	**9&10**	**a/1, a/3**	**b/2, b/3**	**c/1**	**d/1, d/2, d/6**
Control of gene expression (prokaryotes), The lac operon & The trp operon.	**11&12**	**a/4**	**b/3**	**c/1, c/4**	**d/1, d/2, d/8**
Control of gene expression (Eukaryotes)	**13&14**	**a/1, a/4**	**b/1, b/3**	**c/1, c/4**	**d/1, d/4, d/7**

Course coordinator: Prof. Dr. Adal Guirgius
Dr. Alaa Saad Abo El Hakar

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-18**	**Course Title:**	**Gene probes**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1-Applying analytical methods and specialized knowledge and Gene probes are commonly used to screen for mutant alleles that cause disease. 2/2- Classifying main scientific advances of using the quality assurance principles between the homogeneous test procedure and signal detection. **2/3-** Summarizing actual fundamental of ethical and legal practice in the field of the determination a nucleic acid sequence (a "gene probe assay") 2/4 Appointing suitable methods for different basic properties of the non-hybridized labeled gene probe contributes to a smaller extent to undesired signal formation. 2/5- Defining technical terms used in scientific researches in genetics.

3. Intended Learning Outcomes of Course (ILO's)	
cc.Knowledge and Understanding:	1- Express the attitudes and ethical basis in scientific /a research and in molecular biology applications (gene probes). Describe basic facts and theories of the biotechnology 2-/a of qualitatively or quantitatively detecting the signal to be attributed to the label using a method suitable. a/3 - Classify main scientific advances of relationship between the which the receptor is a monoclonal modified antibody or a chemically modified antibody fragment. a/4- Summarize the mechanisms regulating of gene expression biotechnology and gene probes.

dd. Intellectual skills:	1- Derive different application of gene probes in the field /b of agriculture and medicine. 2- Compare between different methods of gene probes./b 3- Analyze scientific researches to solve the problems of /b application in gene probes. 4- Evaluate professional risks during treatment and / b determination of gene probes.
ee. Practical and Professional Skills of course:	1- interpret and analyses experimental data of gene probes./c c/2- - Form Quality written reports biochemical determination measuring of molecular probes. 3- Analytical methods for determination Hybridization /c Conditions and applications 4 - Calculate a biochemical accurate observations and /c measurements in gene probes target.
ff. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying gene probing. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Probe Design
2	Gene Probes
3	Oligonucleolide Probes
4	Labeling and Detection
5	Types of Label
6	, Southern blot, North blot Labeling Methods
7	and Applications Hybridization Conditions

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
v. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
w. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
x. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	9- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). -2- Arrand et al in Nucleic Acid Hybridization: A Practical Approach, IRL Press, Washington D.C. (1985) pp. 42-45. 3- W.P. Collins, "Alternative Immunoassays", John Wiley and Sons, (1985). Table of Contents. 4- S. L. Beaucage et al., "Tetrahedron Report Number 329", Tetrahedron, vol. 49, No. 10, (1993), pp. 1925-1963. 5- L. J. Arnold Jr., "Assay Formats Involving Acridinium-Easter Labeled DNA Probes", Clin. Chem., vol. 35, No. 8, (1989), pp. 1588-1594. 6- J. Goodchild, "Conjugates of Oligonucleotides and Modified Oligonucleotides: A Review of Their Synthesis and Properties", Bioconjugate Chemistry, vol. 1, No. 3, (May/Jun. 1990), pp. 165-187.

	7- J. A. Matthews et al., "Enhanced Chemiluminescent Method for the Detection of DNA Dot-Hybridization Assays", Analytical Biochemistry, vol. 151, (1985), pp. 205-209.
a. Suggested Books	11. Molecular Cell Biology, 5th edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell. W.H. Freeman & Co., 2011. 12. Genes VIIII. Lewin. Prentice Hall, 2011
13. Periodicals, Web Sites, … etc ...	b- Periodicals, Web sites, … etc …www.prenhall.com/lewin. c- www.prancipal genetics. d- http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=mboc4.TOC&depth=2 e- http://bcs.whfreeman.com/lodish6e/

Course coordinator: Prof. Dr. Amal Abd El- Aziz

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Gene Probes Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Probe Design	1&2	a/1, a/4	b/1,	c/1, c/2	d/1, d/2
Gene Probes	3&4	a/2, a/3	b/1, b/2	c/1,c/3	d/1, d/3
ligonucleolide Probes	5&6	a/1, a/2	b/1, b/3	c/1, c/5	d/1, d/4
Labeling and Detection	7&8	a/1, a/2	b/1,b/2	c/1, c/3	d/1, d/3, d/4
Types of Label	9&10	a/1, a/3,	b/2, b/3	c/1, c/4	d/1, d/5, d/6
Labeling , Methods Stheuer blot, North blot	11&12	a/3, a/4	b/2, b/4	c/1, c/4	d/1, d/4, d/5
Hybridization , Conditions Applications	13&14	a/3, a/4	b/1, b/4	c/1, c/3, c/4	d/1, d/5, d/6

Course coordinator: Prof. Dr. Amal Abd El-Aziz
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-25	**Course Title:**	**Human genome**				
No. units	3	**Lect.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identify the genetic mutations and abnormalities that can result in disease conditions 2/2- Developing describe the role of genes in human biology and society. 2/3- Differencing between the molecular analyses for diagnosis and consequences of these malfunctions (genetic diseases), to the genetic structure of whole populations. 2/4- Expressing the gene expression profile will be considered of gene structure and identification, to inheritance mechanisms and how genes work within the cellular environment.

3. Intended Learning Outcomes of Course (ILO's)	
gg. Knowledge and Understanding:	Describe basic facts and theories of the biotechnology 1-/a use in molecular biology diagnosis, control of certain diseases in human genome. a/2- Classify Chromosome, genome structure and functions. a/3- Name Chromosome abnormalities: how they arise, risks of occurrence and their detection a/4- Summarize Prenatal tests and screening for genetic defects a/5- Express the Non-traditional inheritance: mosaicism, microdeletion syndromes, uniparental disomy, genome imprinting, trinucleotide repeats, mitochondrial disorders a/6- Divide the events in sexual development and some genetic abnormalities and common single gene disorders, their cause, diagnosis, and recurrence risks a/7- Describe How and where new mutations arise and the possible consequences: somatic and germinal and Common multifactorial traits and recurrence risks

	a/8- Explain Common teratogens and the embryopathies they produce and expresses of DNA fingerprinting in identification of individuals
hh. Intellectual skills:	1- Compare between different methods of molecular /b alterations and induced diseases in human genome. b/2- Interpret how single gene anomalies and chromosome aberrations of number and structure now known in humans (along with their meiotic basis), affect the incidence of birth defects, and are the probable casual effects in many cancers. b/3- Derive Evidences how polygenic (multifactorial) genetics contributes to the inheritance and determination of more complicated human traits. b/4- Plan between our current knowledge in molecular genetics to appreciate and explain the structure of genes. b/5- Analyze Information of selective forces in evolution, and current day residuals, to explaining how genetic diseases have obtained their frequencies in various populations
ii. Practical and Professional Skills of course:	1- Write the report of genetics, involving autosomal /c recessive inheritance c/1- Measure the different types of genetic screening programs currently in use, describe the purpose of each, and explain how each is affecting the frequency of abnormal genes and genotypes screened c/3- Execute of population genetics factors which cause changes in gene frequencies, and thus determine the basis of evolutionary change. c/4- Enhancement of oral and written communication skills of human genome by applying them to counseling, screening, ethics, law, and evaluating their social implications..
jj. General and Transferable Skills	1- Communicate effectively using all methods with /d public, collegeous and appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given human genome course topics. d/5- Work in teams and capable to Manage time effectively d/6- Work as team leader in situation comparable to his/her level. d/7- Learn independently and seek continuous learning in human genome.

	4. Course Contents:

No.	Topic
1	The structure and function of genes
2	Genotype phenotype correlations in genetic disease
3	Ethical issues in genetic testing
4	Patterns of Inheritance
5	Autosomal dominant inheritance
6	Molecular diagnosis of genetic disorders
7	Autosomal recessive inheritance

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:		
y. Assessment Methods:	Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam	
z. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.	
aa. Weighting of Assessments	Degrees 15 10 15 60 Total=100	% 15% 10% 15% 60% 100%

8. List of References:	
9. Notes	shaalan's text book of pediatrics (For Free) Obtained copy from the institute library
10. Essential Books (Text Books)	Nelson Text book of pediatrics
11. Suggested Books	For far text book of pediatrics
12. Periodicals, Web Sites, … etc ...	Pediatrics clinic of North America

Matrix of Knowledge, Skills ILOs for Human Genome Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
THE STRUCTURE AND FUNCTION OF GENES	**1&2**	**a/1**	**b/1**	**c/1,c/2**	**d/1, d/2**
GENOTYPE-PHENOTYPE CORRELATIONS IN GENETIC DISEASE	**3&4**	**a/2, a/4**	**b/1**	**c2, c/3**	**d/1, d/4**
ETHICAL ISSUES IN GENETIC TESTING	**5&6**	**a/2, a/8**	**b/1**	**c/3, c/4**	**d/2, d/7**
Patterns of Inheritance(introduction)	**7&8**	**a/3, a/5**	**b/2, b/5**	**c/1**	**d/2, d/5**
AUTOSOMAL DOMINANT INHERITANCE	**9&10**	**a/4, a/6**	**b/3**	**c/1, c/3**	**d/3, d/6**
MOLECULAR DIAGNOSIS OF GNETIC DISORDERS	**11&12**	**a/4**	**b/4, b/5**	**c/2**	**d/3, d/6**
AUTOSOMAL RECESSIVE INHERITANCE	**13&14**	**a/4, a/7**	**b/4**	**c/3**	**d/4, d/5, d/7**

Course coordinator: Prof. Dr. Kalil Halfawy
Dr Usama F Shaalan

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-28	**Course Title:**	Human cell biology				
No. units	3	**Lecturers.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1 Preparing Master Graduate having capability of applying the basics and methodologies of scientific research in the field of molecular biology (human cell biology). 2/2 Applying analytical methods and specialized knowledge and using appropriate technological means in human cell biology. 2/3 Understanding the molecular aspects of cell receptors and processing of signal transduction.

3. Intended Learning Outcomes of Course (ILO's)	
kk. Knowledge and Understanding:	a/1 Summarize fundamentals of molecular biology of the cell. 2/a Classify the contributions of cell organelle in molecular processes involved in cell division and cell death. 3 /a Describe the molecular interaction involved in cell division, cell signaling and host-pathogen interaction. 4 /a Recognize the mechanisms involved in cell function, cell to cell and pathogen interaction and signal transduction.
ll. Intellectual skills:	1 /b Plan the identification of recent specific and sensitive assays for evaluation of molecular cellular functions. b/2 Compare between the recent and sensitive assays required to measure the cellular immune response and signal transduction. 3 /b Analyze the evidences for the critical role of host cell receptors in the initiation of signals transduction. 4 /b Interpret the data and deduce correlations between cell organelles and cell functions. 5 /b Derive the skills in modern laboratory techniques for isolation and identification of different gene expression at RNA and protein levels.

mm. Practical and Professional Skills of course:	Not Applicable (N/A)
nn. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in the field of human cell biology. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topics**
1	Human cell structure
2	Function of individual organic
3	Cell division
4	Gene expression
5	Signal transduction
6	Cell to cell interaction
7	Cell death

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
bb. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
cc. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week

	- (15th) Week.
dd. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%
8. List of References:	
9. Notes	
10. Essential Books (Text Books)	١. -Molecular Biology of the Cell, Fourth Edition. ٢. -Asthagiri A, Lauffenburger D. Bioengineering Models of Cell Signaling. Annual Review of Biomedical .Engineering, 2:31-53, 2000.
11. Suggested Books	٣. -Essential Cell Biology, Second Edition. -Molecular Cell Biology, 5th edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell. W.H. Freeman & Co., 2011.
12. Periodicals, Web Sites, … etc ...	-Journal of Biological Chemistry(JBC).www.jbc.com www.biochemistryonline.com

Course coordinator: Prof.Dr. Shaden Muawia
Dr. Hany Kalil
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Human cell biology Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Human cell structure	1&2	a/1	b/1	N/A	d/1
Function of individual organic	3&4	a/2	b/1, b/5	N/A	d/1, d/6
Cell division	5&6	a/2	b/2	N/A	d/2
Gene expression	7&8	a/3	b/2	N/A	d/2
Signal transduction	9&10	a/4	b/3	N/A	d/3
Cell to cell interaction	11&12	a/4	b/4, b/5	N/A	d/3, d/6
Cell death	13&14	a/4	b/4	N/A	d/4, d/5

Course coordinator: Prof.Dr. Shaden Muawia
Dr. Hany Kalil
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-31**	**Course Title:**	**Mitochondria**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Preparing Master Graduate having capability of applying the basics and methodologies of scientific research used in the field of molecular biology of the Mitochondria**.** 2/2- Introducing students to the advanced information about the Mitochondria biology. 2/3- Applying analytical methods to relate mitochondrial biology to major neurodegenerative diseases including Parkinson's and Alzheimer's 2/4- Demonstrating awareness of the major source and reactive oxygen species, the mitochondrion is likely also to be involved in ageing. 2/5- Linking the cell biology of mitochondria and its activities to human diseases.

3.Intended Learning Outcomes of Course (ILO's)	
oo. Knowledge and Understanding:	a/1. Express the attitudes and ethical basis in scientific research and in mitochondrial biology a/2. Classify different types of mitochondrial and Energy metabolism in different bodies. a/3.Summarize the different metabolic in sensors in cancer. a/4. Describe the important role of Epigenetic and Genetic Changes Induced by Mitochondrial Dysfunction. a/5. Express the damage of mitochondrial DNA in aging and age-related diseases.
pp. Intellectual skills:	b/1. Interpret different information to solve the problems of the performance of the mitochondrial biology toward diseases. b/2. Analyze mtDNA mutations to generate experimental models of mitochondrial diseases b/3. Compare between different methods of molecular

	alterations and induced diseases. b/4. Plan the strategy used genes to build bioinformatics approaches to study mtDNA variability in cancer.
qq. Practical and Professional Skills of course:	**Not Applicable (N/A)**
rr. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in studying mitochondria structure. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Energy metabolism in proliferation and high nutrient demand in mitochondria
2	Metabolic sensors in cancer: from oxygen to amino acid sensing
3	Epigenetic and Genetic Changes Induced by Mitochondrial Dysfunction and its role Tumorigenesis
4	mitochondria crosstalk in the control of cell fate
5	Damage to mitochondrial DNA in aging and age-related diseases
6	Inducing heteroplasmy of mtDNA mutations to generate experimental models of mitochondrial diseases & Cellular adaptations to OXPHOS defects in cancer
7	Bioinformatics approaches to study mtDNA variability in cancer

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester work -Midterm exam - Oral exam - Written final exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	- Biochemistry 4^{th} edition ,Geoffrey L.Zubay McGraw-Hill Co. 2004 - Genetics the continuity of life Daniel J. Delvlin , Wiley-liss,Inc 2006. - Paul WE. (2008) Fundamental Immunology, 6^{th} edition. Lippincott Williams & Wilkins Company.
11. Suggested Books	- Principles of Biochemistry Horton Moran , Scrimgeour , Perry and Rawn editor, 4^{th}Edition
12. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED http://www.ahsl.arizona.edu/ **http://www.biology.arizona.edu/immunology/tutorials/antibody/structure.html** http://www.hhmi.org/biointeractive/immunology/vlab.html www.biochemistryonline.com

Course coordinator: Prof. Dr. Sabah Farok
Head of Department: Prof. Dr. **Ibrahim Helmy**

Matrix of Knowledge, Skills ILOs for Mitochondria Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Energy metabolism in proliferation and high nutrient demand in mitochondria	**1&2**	**a/1,a2,**	**b/1,**	**N/A**	**d/1, d/2, d/4**
Metabolic sensors in cancer: from oxygen to amino acid sensing	**3&4**	**a/1,a/3,a/4,**	**b/1,b/2, b/5,**	**N/A**	**d/1, d/3**
Epigenetic and Genetic Changes Induced by Mitochondrial Dysfunction and its role Tumorigenesis	**5&6**	**a/1,a/3,a/4,**	**b/1,b/3, b/4,**	**N/A**	**d/1, d/4**
mitochondria crosstalk in the control of cell fate	**7&8**	**a/1,a/3,a/4,**	**b/1,b/2,b/4,**	**N/A**	**d/1, d/5, d/6**
Damage to mitochondrial DNA in aging and age-related diseases	**9&10**	**a/1,a/5**	**b/1,b/3**	**N/A**	**d/1, d/4, d/5**
Inducing heteroplasmy of mtDNA mutations to generate experimental models of mitochondrial diseases & Cellular adaptations to OXPHOS defects in cancer	**11&12**	**a/1,a/4**	**b/1,b/3**	**N/A**	**d/1, d/4, d/5**
Bioinformatics approaches to study mtDNA variability in cancer	**13&14**	**a/1,a/5**	**b/1,b/4**	**N/A**	**d/1, d/5, d/6**

Course coordinator: **Prof. Dr. Sabah Farok**
Head of Department: **Prof. Dr. Ibrahim Helmy**

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-34**	**Course Title:**	Molecular biology of eukaryotic cells				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Improving skills of the Master graduate in identifying molecular biology problems and using available resources to solve them & to achieve highest benefits. 2/2- Developing describe the relationship between calcium signaling, molecular motors and cell motility, 2/3- Differentiating between the cell signaling, and gene expression during development. 2/4- Expressing the attitudes and ethical basis in scientific research and the dynamics of intracellular second-messenger signaling. 2/5- Classifying main scientific advances in studying cellular organelles and ultra structure and their related functions

3. Intended Learning Outcomes of Course (ILO's)	
ss. Knowledge and Understanding:	a/1- Describe quality standards of the practice during the analysis and determination of in molecular biology of eukaryotic cells. a/2- Summarize actual fundamental of ethical in the field of The cytoskeleton system that the physiological behavior (input-output characteristics) of living cells. a/3 - Write list of the basic rules and scientific terms of English language of the dynamics of intracellular second-messenger signaling. a/4- Classify The Immune system Cancer and Apoptosis
tt. Intellectual skills:	b/1- Compare between the different normal and abnormal patterns of genetic materials by using different molecular biology eukaryotic cells. b/2- Appoint suitable methods for different biochemical structures of the molecules and compounds essential for vital body processes.

	b/3- Compare between different methods examining the structure and function of cellular components on the molecular scale. b/4- Plan the identification recent specific the relationship between extracellular signaling and intracellular second-messenger signaling .
uu. Practical and Professional Skills of course:	c/1- Analyze the data from experiments and to interpret them in the light of published work. c/2- Execute and Appling a range of practical skills relevant to your chosen areas of Molecular biology of eukaryotic cells. c/3 - Prepare written reports of the various types of cell signaling mechanisms in eukaryotes.
vv. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in Molecular biology of eukaryotic cells. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	The Cell Nucleus,
2	Membrane Transport
3	Organelles involved in intracellular transport and sorting. Ultrastructure and Cytochemistry of Endoplasmic Reticulum, Golgi Complex, Lysosomes, Peroxisomes, Secretory Granules.
4	Energy production and cell signaling, Mitochondrial Ultra structure and function
5	Cell Signaling
6	The Immune system Cancer
7	The cytoskeleton system

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
ee. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
ff. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
gg. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	11- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 12- Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. 13- De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. **14-** Bower JM, Bolouri H (Eds.)(2001). Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press,
11. Suggested Books	**12. Molecular Biology of the Cell, 4th edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010.** 13. **Genes VIIII. Lewin. Prentice Hall, 2011.**
14. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. www.prancipal genetics.

Matrix of Knowledge, Skills ILOs for Molecular biology of eukaryotic cells Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
The Cell Nucleus, Chromatin, Chromosomes, Nucleosomes	**1&2**	**a/2**	**b/2**	**c/1, c/3**	**d/1, d/4**
Membrane Transport	**3&4**	**a/1**	**b/2**	**c/2**	**d/1, d/4**
Organelles involved in intracellular transport and sorting.	**5&6**	**a/1**	**b/1**	**c/3**	**d/3, d/5**
Energy production and cell signaling, Mitochondrial Ultra structure and function	**7&8**	**a/3**	**b/1**	**c/1, c/2**	**d/1, d/3, d/6**
Cell Signaling,	**9&10**	**a/3**	**b/1, b/4**	**c/3**	**d/2, d/6**
The Immune system Cancer	**11&12**	**a/3**	**b/3**	**c/1, c/4**	**d/1, d/2**
The cytoskeleton system	**13&14**	**a/4**	**b/3**	**c/1**	**d/4**

Course coordinator: Prof. Dr. Amal Abd El-Aziz
Dr. Salwy El- Saied
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-35**	**Course Title:**	**Molecular biology I**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- The students, on completion of the course, will be able to know Molecular biology I and help students to understand from gene to protein in prokaryotes and Eukaryotes. 2/2- Describing molecular biology1 problems and using available resources to solve them & to achieve highest benefits. 2/3- Comparing between versatility of RNA in prokaryotes and Eukaryotes 2/4- Summarizing Genome organization: From nucleotides to chromatin and telomeres function.

3. Intended Learning Outcomes of Course (ILO's)	
ww. Knowledge and Understanding:	a/1- Describe basic facts and theories of molecular biology1 a/2- Summarize main basics & ethics of scientific researches of versatility of RNA a/3- Express the principles and concepts of from gene to protein in prokaryotes and Eukaryotes a/4- Classify the relationship between structure and function of telomeres. a/5- Divide the mechanisms regulating of gene expression biotechnology and understanding the functions of specific gene products. a/6- Summarize the fundamental biochemical structures of the molecules and compounds essential for vital body processes.
xx. Intellectual skills:	b/1- Compare between the different normal and abnormal patterns of genetic materials by using different molecular biology techniques. b/2- Analyze and interpret the versatility of RNA. b/3- Compare the genome organization and genetically

	modified organisms
yy. Professional Skills of course:	c/1- Analyses the data from your own and other people's experiments and to interpret them in the light of published work. c/2- write report on the different gene to protein in prokaryotes and Eukaryotes. c/3- Execute practical skills relevant to telomeres in chromosomes. c/4- Form skills to understand complementarily and polarity of the genetically modified organisms and their use in basic and applied research.
zz. General and Transferable Skills	d/1- Use information technology to improve his professional practice in internet and relative information. d/2- Use different sources of information to obtain data for a given molecular biology I course topics d/3- Manage time effectively. d/4- Work as team leader in situation comparable to his level. d/5- Learn independently and seek continuous learning in molecular biology

	4. Course Contents:
Week No.	**Topic**
1&2	Introduction and perspective.
3&4	Genome organization: From nucleotides to chromatin
5&6	The versatility of RNA
7&8	From gene to protein in prokaryotes.
9&10	From gene to protein in Eukaryotes.
11&12	Genetically modified organisms and their use in basic and applied research.
13&14	Telomeres.

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
hh. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
ii. Assessment Schedule	- (5^{th} to10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
jj. Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Fundamental Molecular Biology, by Lizabeth Allison - Molecular Biology of the Gene, by James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, and Richard Losick. (6th Edition, 2007, Publisher, Benjamin Cummings/Pearson)
11. Suggested Books	Molecular Biology of the Cell, Alberts et al 4th Edition, Garland. Updated fall of 2001
d -Periodicals, Web Sites, … etc ...	http://www.ncbi.nlm.nih.gov/books http://bcs.whfreeman.com/lodishe

Course Name	**Molecular biology I**
Course Code	**B1-35**

Course coordinator: Prof. Dr. Amal Ahmed Abd El Aziz
Dr. Salow El Saied
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular biology I Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Professional Skills of course	d-General and Transferable Skills
Introduction and perspective.	**1&2**	**a/2,**	**b/1**	**c/1**	**d/3**
Genome organization: From nucleotides to chromatin	**3&4**	**a/2,a/4**	**b/2**	**c/3**	**d/1,d/2,d/4**
The versatility of RNA	**5&6**	**a/2,a/3**	**b/3**	**c/2**	**d/1,d/5,d/4**
From gene to protein in prokaryotes.	**7&8**	**a/2**	**b/2**	**c/3,c/4**	**d/1,d/3**
From gene to protein in Eukaryotes.	**9&10**	**a/2**	**b/3**	**c/3**	**d/1,d/2,d/4**
Genetically modified organisms and their use in basic and applied research.	**11&12**	**a/1,a/4,a/6**	**b/3**	**c/3**	**d/2,d/4**
Telomeres.	**13&14**	**a/3,a/4, a/5**	**b/1, b/2**	**c/3**	**d1,d5**

Course coordinator: Prof. Dr. Amal Ahmed Abd El Aziz
Dr. Salow El Saied
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-39**	**Course Title:**	**Molecular biotechnology**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1-Preparing Master Graduate having capability of applying the basics and methodologies of scientific research using of its different tools in the field of biotechnology. 2/2-Applying analytical methods & specialized knowledge and using appropriate technological means in molecular biotechnology. 2/3- Developing biotechnology knowledge and integrate it with professional skills to solve the molecular biology problems. 2/4- Describing the structure and products aim of the biotechnology industry. 2/5- Interpreting information to classify recombinant DNA and genetic engineering methods.

3. Intended Learning Outcomes of Course (ILO's)	
aaa. Knowledge and Understanding:	a/1- Describe basic facts and theories of the biotechnology use in molecular biology a/2- Summarize main basics & ethics of scientific researches of molecular biotechnology fields a/3- Classify the basic rules and scientific terms of English language of molecular biotechnology area. a/4- Express the mechanisms regulating gene expression and understanding the functions of specific gene products that are important in biotechnology.
bbb. Intellectual skills:	b/1- Appoint suitable methods for different genetic engineering of agriculture and medicine. b/2- Interpret Information about results of molecular assays for better analyzing and solving problems. b/3- Derive evidences to Describe the molecular characterization of different organisms and how to

	control their genes expression.
ccc. **Practical and Professional Skills of course**:	c/1- Analyses the data by him own and other people's experiments and to interpret them in the light of published work. c/2- Select biosafety regulations relating to GMO c/3- Prepare written reports of molecular biology analysis and risk assessment using English language.
ddd. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of molecular biotechnology.. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Introduction to DNA technology and perspective
2	Recombinant DNA technology
3	Protein engineering
4	Genetically modified microorganisms
5	Transgenic plants and animals
6	Bioethics of molecular biotechnology and. Biosafety regulations relating to GMO
7	Stem cells

5. Teaching and Learning Methods	
	Lectures Class activities Discussion Presentation Reports

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
kk. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
ll. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
mm. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Molecular Biotechnology: Glick BR, Pasternak JJ. 2003. - Biochemistry and Molecular Biology of Plants. 2000. B.B. Buchanan, W. Gruissem and R.L. Jones (eds). American Society of Plant Biology, Rockville, USA.
11. Suggested Books	-Molecular Biology of the Cell, 4^{th} edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010. -Basic Biotechnology, 3rd Ed., Ratledge and Kristiansen, 2006 - Molecular Biology of the Gene, Watson, J.D., et al., 2008, 6th edition. Benjamin Cummings and Cold Spring Harbor Laboratory Press -Plant Biotechnology: The genetic manipulation of plants. 2003. A. Slater, N. Scott and M. Fowler. Oxford University Press, Oxford.
12. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. www.prancipal genetics.

Matrix of Knowledge, Skills ILOs for Molecular Biotechnology Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
The central dogma of molecular biology and DNA technology	1&2	a/1,a/2	b/1	c/3	d/1
Recombinant DNA technology	3&4	a/2	b/2	c/3	d/3, d/5
Protein engineering	5&6	a/4	b/1	c/3	d/1
Genetically modified microorganisms	7&8	a/3,a/4	b/1	c/1	d/1
Transgenic plants and animals	9&10	a/1,a/2	b/1	c/3	d/2, d/3
Bioethics of molecular biotechnology and. Biosafety regulations relating to GMO	11&12	a/2,a/3	b/3	c/2,c/3	d/2,d/4,d/7
Stem cells	13&14	a/3,a/4	b/1,b/2	c/1	d/5,d6

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gahan Ibrahim
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**B1-46**	**Course Title:**	**Molecular Entomology**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Preparing Master Graduate having capability of applying the basics and methodologies of scientific research using of its different tools in the field of molecular biology (Molecular Entomology). 2/2- Developing academically and professionally the students' capabilities in molecular entomology and the continuous learning ones. 2/3- Demonstrating awareness the ability to lead a working team and having the capability to make decisions in different professional contexts in molecular entomology. 2/4- Expressing and differentiate the mode of action of some toxic agents like pesticides and insecticides and their effects on the genetic alterations of different species.

3. Intended Learning Outcomes of Course (ILO's)	
eee. Knowledge and Understanding:	a/1- Express the attitudes and ethical basis in scientific research and in molecular biology applications of molecular entomology. a/2- Explain basics and ethics of scientific researches of chemistry, biochemistry, mode of action, and resistance. a/3 - Summarize actual fundamental of ethical and legal practice in the field of Insect growth- and development-disrupting Insecticides. a/4- Describe the relationship between different pathways and signaling in defense mechanism against challenge. a/5- Divide molecular investigations to achieve a definitive indoxacarb and the sodium channel blocker insecticides: chemistry, physiology, and biology in insects.
fff. Intellectual skills:	b/1- Plan the identification recent specific and sensitive assays for evaluation of molecular entomology.

	b/2- Compare between different methods of molecular biology alterations and insect growth- and development-disrupting insecticides. b/3- Analyze the suitable methods for different of specific relationship between host and host pathogen. b/4- Derive the paraphrasing English technical terms processes using in scientific researches of mechanism insects and products as a source of pathogen recovery. b/5- Interpret different information to solve the problems of develop the performance in the applications of natural product in insect control.
ggg. Practical and Professional Skills of course:	**Not Applicable (N/A)**
hhh. General and Transferable Skills	d/1- Use Audio & Video Means for Displaying molecular entomology. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given molecular entomology course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively & work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

4. Course Contents:

No.	Topic
1	Indoxacarb and the Sodium Channel Blocker Insecticides: Chemistry, Physiology, and Biology in Insects
2	Insect Growth- and Development- Disrupting Insecticides
3	Azadirachtin, a Natural Product in Insect Control
4	The Spinosyns: Chemistry, Biochemistry, Mode of Action, and Resistance
5	Mosquitocidal Bacill sphaericus: Toxins, Genetics, Mode of Action, Use, and Resistance Mechanisms
6	Entomopathogenic Fungi and their Role in Regulation of Insect Populations
7	The Biology and Genomics of Polydnaviruses

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
nn. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
oo. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
pp. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Marjorie A. Hoy (2003) Insect Molecular Genetics (Second Ed.) - Jack E. Rechcigl and Nancy A. Rechcigl.(1999) Biological And Biotechnological Control of Insect Pests - Comprehensive Molecular Insect Science Volume1,2,4, 6 -Asthagiri A, Lauffenburger D. Bioengineering Models of Cell Signaling. Annual Review of Biomedical .Engineering, 2:31-53, 2000.
11. Suggested Books	Nadine Carozzi And Michael Koziel Advances in Insect Control: The role of transgenic plants (This edition published in the Taylor & Francis e-Library, 2010.
12. Periodicals, Web Sites, … etc ...	http://www.academicpress.com http://www.sciencedirect.com/science/referenceworks Comprehensive Molecular Insect Science Volume 6

Matrix of Knowledge, Skills ILOs for Molecular Entomology Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Indoxacarb and the Sodium Channel Blocker Insecticides: Chemistry, Physiology, and Biology in Insects	**1&2**	a/1	b/1, b/2	N/A	d/1, d/6
Insect Growth- and Development-Disrupting Insecticides	**3&4**	a/2	b/1, b/3	N/A	d/2, d/4
Azadirachtin, a Natural Product in Insect Control	**5&6**	a/2	b/3	N/A	d/1, d/3,
The Spinosyns: Chemistry, Biochemistry, Mode of Action, and Resistance	**7&8**	a/1, a/5	b/3, b/4	N/A	d/3, d/6
Mosquitocidal Bacill sphaericus: Toxins, Genetics, Mode of Action, Use, and Resistance mechanisms	**9&10**	a/2 ,a/3	b/2	N/A	d/1, d/5, d/6
Entomopathogenic Fungi and their Role in Regulation of Insect Populations	**11&12**	a/3	b/2 , b/5	N/A	d/1, d/4
The Biology and Genomics of Polydnaviruses	**13&14**	a/3, a/4	b/2, b/5	N/A	d/1, d/4

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gehan Mohamed Ahmed Ibrahim
Head of the department council: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1- 48**	**Course Title:**	**Molecular genetic analysis of Population**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identify the genetics of populations, including quantitative, population, and evolutionary genetics. 2/2- Analyzing molecular genetics of population problems and using available resources to solve them & to achieve highest benefits. 2/3- Deriving how to estimate population parameters that are important descriptors of genetic variation 2/4- Linking between molecular genetics techniques and population data and execute analyzing molecular data in population genetic field.

3. Intended Learning Outcomes of Course (ILO's)	
iii. Knowledge and Understanding:	a/1- Describe basic facts and theories of molecular biology, and population genetic. a/2- Summarize main basics & ethics of scientific researches of molecular genetic analysis of population fields a/3- Determine the relationship between population structure and molecular biology. a/4- Divide the mechanisms regulating of genetic variation a/5- Express the population parameters that are important descriptors of genetic variation.
jjj. Intellectual skills:	b/1- Compare between the different gene flow and Gene loci used in population genetics studies b/2- Analyze and interpret the results of molecular genetic analysis of population for better understanding and solving problems. b/3- Derive the parameters of population genetics with the parameters of different biological sciences b/4- Analyzing the differences between Data base analysis

	and gene bank
kkk. Practical and Professional Skills of course:	c/1- Analyses the data from your own and other people's experiments and to interpret them in the light of published work. c/3- Execute and apply a range of practical skills relevant to molecular population genetics c/3- Form skills to understand complementarily and polarity of the population genetic. c/4- Apply modern softwares in analyzing obtained data and to solve problems.
lll. General and Transferable Skills	d/1- Communicate effectively using all methods with public, collegeous and appropriate authorities d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Use different sources of information to obtain data for a given molecular genetic analysis of population course topics d/4- Manage time effectively. d/5- Learn independently and seek continuous learning in molecular genetic analysis of population.

	4. Course Contents:
No.	**Topic**
1	Introduction to population genetics, Hardy & Weinberg law and deviation
2	Population structure, Gene flow and Gene loci used in population genetics studies
3	Molecular techniques used in population genetics studies
4	How to analyze results of molecular techniques used in population generics
5	Mitochondrial genome and its genes
6	Genetic resources
7	Data base analysis and gene bank

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:		
qq. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam	
rr. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.	
ss. Weighting of Assessments	Degrees 15 10 15 60 Total=100	% 15% 10% 15% 60% 100%

8. List of References:	
١٣. Notes	Hand-out to the students in addition to internet-based courses
١٤. Essential Books (Text Books)	●The Origins of Theoretical Population Genetics, by William B. Provine, (1971) ●A Primer of Population Genetics, by Daniel L. Hartl, (1981)
١٥. Suggested Books	Molecular Biology of the Cell, Alberts et al 4th Edition, Garland. Updated fall of 2001
d -Periodicals, Web Sites, … etc ...	http://www.ncbi.nlm.nih.gov/books

Course coordinator: Prof.Dr. Mahmoud Nasr

Head of the department council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular genetic analysis of Population Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction to population genetics, Hardy & Weinberg law and deviation	1&2	**a/4**	**b/4**	**c/1**	**d/1,d/3**
Population structure, Gene flow and Gene loci used in population genetics studies	3&4	**a/1,a/3**	**b/3**	**c/2**	**d2,d3**
Molecular techniques used in population genetics studies	5&6	**a/2,a/5**	**b/4**	**c/3,c/4**	**d3,d5**
How to analyze results of molecular techniques used in population genetrics	7&8	**a/2,a/5**	**b/4**	**c/3**	**d3,d4**
Mitochondrial genome and its genes	9&10	**a/2,**	**b/5**	**c/4**	**d3,d4**
Genetic resources	11&12	**a/2,a/3**	**b/2,b/4**	**c/3**	**d2,d3**
Data base analysis and gene bank	13&14	**a/1,a/2,a/3**	**b/3,b/4**	**c/1,c/2**	**d3,d5**

Course coordinator: Prof.Dr. Mahmoud Nasr

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**B1-52**	**Course Title:**	**Molecular Hematology B1- 52**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- The students, on completion of the course, will be able to know **Basis of Hematology and** help students to understand from doing Blood Counting to Read the detail of the blood film (Normal or with any Changes or diseases). 2/2- The detail of Clotting Factors, with Intrinsic and Extrinsic effects. 2/3- Comparing between Types of anemia's and RBCs Changes. 2/4- Staining of different Blood Films and blood slides.

3. Intended Learning Outcomes of Course (ILO's)	
mmm. Knowledge and Understanding:	a/1- Describe basic facts and details of molecular Hematology. a/2- Summarize main basics & Recent scientific researches of versatility of blood Diseases. a/3- Express the principles and concepts of Reading Blood Film. a/4- Classify the relationship between Shape of blood cell and the types of Anemia's. a/5- Divide the mechanisms regulating blood Clotting and the blood diseases (Like Hemophilia and Purpra). a/6- Summarize the fundamental Hematological Determination of the blood changes with different stains and diseases.
nnn. Intellectual skills:	b/1- Compare between the different normal and abnormal Slide of the blood cell. b/2- Analyze and interpret the Anemia's types. b/3- Compare the Normal Cell with Films with different diseases.

ooo. Professional Skills of course:	Not Applicable (N/A)
ppp. General and Transferable Skills	d/1- Use information technology to improve his professional practice in internet and relative information. d/2- Use different sources of information Numerical data on blood Staining Slides of different diseases. d/3- Manage time effectively. d/4- Work as team leader in situation comparable to his level. d/5- Learn independently and seek continuous learning in molecular Hematology.

	4. Course Contents:
Week No.	**Topic**
1&2	Introduction and perspective.
3&4	Body Blood in General (Distribution, Volume, Percent and Function).
5&6	Blood Anti-Coagulant (Chemical and Natural) in details.
7&8	Intrinsic and Extrinsic Factors of blood Clotting.
9&10	Blood Parameters determination (Hb, RBCs, WBCs, Differential Count, Prothrombin Time, ESR, etc.).
11&12	Blood Diseases And Blood Anemia's Types.
13&14	Blood Leukemia's (Acute and Chronic).

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
tt. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
uu. Assessment Schedule	- (5^{th} to10^{th}) - (6^{th}) Week - (14^{th}) Week

	- (15th) Week.
vv. Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	Molecular Hematology book by Drew Provan (Editor), John ... www.alibris.com/Molecular-Hematology/book/10726598 Molecular Hematology - Powell's Books *www.powells.com/book/molecular-hematology-9781405182317*
9. Notes	
10. Essential Books (Text Books)	Molecular Hematology, Second Edition - Wiley Online Library *onlinelibrary.wiley.com/book/10.1002/9780470987063*
11. Suggested Books	Molecular Hematology 3rd Edition PDF - Am-Medicine *am-medicine.com/2015/06/molecular-hematology-3rd-edition-pdf.html*
d -Periodicals, Web Sites, … etc ...	Wiley: Molecular Hematology, 2nd Edition - Drew Provan, John ... *www.wiley.com/WileyCDA/WileyTitle/productCd-1405137762.htm*

Course Name	**Molecular Hematology**
Course Code	**B1-52**

Coordinator: Prof. Dr/ Sabah Farouk
Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular biology I Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Professional Skills of course	d-General and Transferable Skills
Introduction and perspective.	**1&2**	**a/2,**	**b/1**	**N/A**	**d/3**
Body Blood in General (Distribution, Volume, Percent and Function).	**3&4**	**a/2,a/4**	**b/2**	**N/A**	**d/1,d/2,d/4**
Blood Anti-Coagulant (Chemical and Natural) in details.	**5&6**	**a/2,a/3**	**b/3**	**N/A**	**d/1,d/5,d/4**
Intrinsic and Extrinsic Factors of blood Clotting.	**7&8**	**a/2**	**b/2**	**N/A**	**d/1,d/3**
Blood Parameters determination (Hb, RBCs, WBCs, Differential Count, Prothrombin Time, ESR, etc.). Blood Diseases And Blood Anemia's Types.	**9&10**	**a/2**	**b/3**	**N/A**	**d/1,d/2,d/4**
Blood Leukemia's (Acute and Chronic).	**11&12**	**a/1,a/4,a/6**	**b/3**	**N/A**	**d/2,d/4**
Carcinomas types and Slide shape..	**13&14**	**a/3,a/4, a/5**	**b/1, b/2**	**N/A**	**d1,d5**

Coordinator: Prof. Dr/ Sabah Farouk
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**B1-54**	**Course Title:**	**Molecular Immunology**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Preparing Master Graduate having capability of applying the basics and methodologies of scientific research used in the field of molecular immunology. 2/2- Introducing students to the advanced information about the immune system and how it responds appropriately. 2/3- Demonstrating awareness the mechanism of genetic regulation of the immune system (antibody and T cell gene regulation). 2/4- Acquiring the mechanism of cytotoxicity used by the immune cells 2/5- Summarizing information about new subsets of cell belonging to the immune system 2/6- Developing the importance of cells participating in innate immunity and the possible ways of communication between them

3. Intended Learning Outcomes of Course (ILO's)	
qqq. Knowledge and Understanding:	a/1. Describe basic facts and theories of the biotechnology used in molecular immunology field. a/2. Classify different types of cells participating in the immune response a/3. Summarize the major genetic mechanisms involved in the immunoglobulin and T cell formation. a/4. Write list of the important role of gene organization in controlling developmental stages of the immune system. a/5. Express how the immune system can go through to belied cytotoxic reaction a/6. Divide new subsets of immune cells recently isolated a/7. Describe the methods of communication (chemical and physical) between different cells participating in the innate immunity

rrr. Intellectual skills:	b/1. Interpret different information to solve the problems of the performance of the immune response toward diseases. b/2. Analyze immunoglobulin genome structure b/3. Derive the information about immune cells and how can they co-ordinate in defense mechanism b/4. Plan the strategy used genes to build immune repertoire b/5. Compare developmental stages of B and T cells b/6. Interpret different mechanisms of cytotoxicity used by the immune system
sss. General and Transferable Skills	c/1. Use Audio & Video Means for Displaying immune cells and organs. c/2. Practice self appraisal and determines his/her learning needs. c/3. Use different sources of information to obtain data for a given immunology course topic. c/4. Enhance the oral communications and effective contacts with students. c/5. Manage time effectively & work in teams. c/6. Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
Week No.	**Topic**
1	Rules of the immune system
2	Antigens
3	Antibody structure and function
4	Antibody genes
5	B cell development
6	Major histocompatibility (MHC) structure and function
7	Mid Term Examination
8	T cells
9	T cell development
10	T cell activation
11	New T cell subsets
12	Innate Immune response (I)
13	Innate Immune response (II)
14	Final Examination

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	
9. Notes	-
Essential Books (Text Books)	1. Abbas AK and Lichtman AH. (2006) Basic Immunology, 2^{nd} edition (updated edition). Saunders Company. 2. Paul WE. (2008) Fundamental Immunology, 6^{th} edition. Lippincott Williams & Wilkins Company.
10. Suggested Books	**1-** Delves PJ; Martin SJ; Burton DR and Roitt IM (2011) Roitt's Essential Immunology. Wiley Company
11. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED http://www.ahsl.arizona.edu/ **http://www.biology.arizona.edu/immunology/tutorials/antibody/structure.html** http://www.hhmi.org/biointeractive/immunology/vlab.html

Matrix of Knowledge, Skills ILOs for Molecular Immunology Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-General and Transferable Skills
Rules of immune system and antigen	**1&2**	a/1,a2,	b/1,	c/1, c/2, d/4
Immunoglobulin genes and B cell development	**3&4&5**	a/1,a/3,a/4,	b/1,b/2, b/5,	c/1, c/3
MHC formation and gene organization	**6**	a/1,a/4	b/1,b/3, b/4,	c/1, c/4
Mid Term Examination	**7**			
T cell receptor genes and T cell development	**8 & 9**	a/1,a/3,a/4	b/1,b3 ,b/5,	c/1, c/5, c/6
T cell activation and New T cell subsets	**10&11**	a/1,a/6	b/1,b/6	c/1, c/4, c/5
Cells of the innate immune response and communication between them	**12&13**	a/1,a/7	b/1,b3,b4,b/6	c/1, c/5, c/6
Final Examination	**14**			

Course coordinator: Ass. Prof. Dr. Roba Mohamed Talaat
Lecturer Sheriff Mohsen El-Sherbiny
Lecturer Dr. Yasser Bastawy Mohamed

Head of Department Prof. Dr. Ibrahim Helmy

Department : Molecular biology

Course Specifications

1. Course information:							
Course Code:	**B1-56**	**Course Title:**	**Molecular parasitology**				
No. Units	**3**	**Lec.**	**3**	**App.**	**-**	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1-Preparing Master Graduate having capability of applying the basics and methodologies of scientific research using of its different tools in the field of molecular Biology (molecular parasitological). 2/2-Developing a postgraduate master student with advanced knowledge concerning biological, epidemiological aspects of parasites causing diseases to humans. 2/3- Applying analytical methods & specialized knowledge and using appropriate technological means in molecular parasitic mode of life. 2/4- Expressing and differentiate molecular parasitology and its application in molecular diagnosis of different parasitic diseases.

3. Intended Learning Outcomes of Course (ILO's)	
ttt. Knowledge and Understanding:	a/1- Describe basic facts and theories of the biotechnology use in molecular biology diagnosis, control of certain diseases. a/2- Divide the morphology and life cycle of parasites of medical importance. a/3- Express the pathological outcome of immune response to parasites. a/4- Classify the relationship between host and their host pathogen. a/5- Summarize the methods of diagnosis and treatment for human parasites.
uuu. Intellectual skills:	b/1 - Compare between different methods of molecular alterations and induced diseases. b/2- Interpret the most important signs and symptoms of

	important parasitic infection. b/3- analyze the immune response of human against parasites b/4- Derive the results between different molecular methods in diagnosis of human parasitism. b/5- Compare between the morphological and pathological characters of different classes of parasites. b/6- Plan the differentiate between parasite classes.
vvv. Practical and Professional Skills of course:	Not Applicable (N/A)
www. General and Transferable Skills	d/1- Use Audio & Video means f displaying parasitism and parasite life cycle. d/2- Practice self appraisal and determines his/her learning needs. d/3- Achieve computer skills to make use of medical databases and use the internet for communication. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively & work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
	Topic
1	Parasite and parasitism
2	Life cycle strategies and Modeling of parasite populations
3	Parasite immune evasion and Host specificity
4	Molecular diagnosis and vaccine development
5	Parasitic protozoans
6	Parasitic Nematodes
7	Parasitic Cestodes and Trematodes

5. Teaching and Learning Methods	
	Lectures Class activities Discussion Presentation Reports

6. Teaching and Learning Methods (for students with special needs)	Not applicable

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Foundations of Parasitology, Roberts L S. and Janovy J. 2004, 7^{th} edn.,
11. Suggested Books	- Diagnostic Medical Parasitology, Lynne Shore Garcia LS., 2006, 5^{th} edn.,
12. Periodicals, Web Sites, … etc.	- WWW.NCBI.NLM.NIH.GOV/PUBMED

Course Coordinator: Prof. Dr. Sabah Farouk
Ass. Prof. Dr. Roba Mohamed Talaat
Lecturer Dr. Yasser Bastawy Mohamed
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular Parasitology Course

Course Contents	Week No.	a- Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Parasite and parasitism	**1&2**	**a/1, a/2, a/4**	**b/1, b2**	**N//A**	**d/1, d/2, d/4**
Life cycle strategies and Modeling of parasite populations	**3&4**	**a/1, a/2**	**b/1, b/2**	**N//A**	**d/1, d/3**
Parasite immune evasion and Host specificity	**5&6**	**a/1, a/3, a/4**	**b/2, b/3**	**N//A**	**d/1, d/4**
Molecular diagnosis and vaccine development	**7&8**	**a/1, a/3, a/4, a/5**	**b/1, b/2, b/4**	**N//A**	**d/1, d/5, d/6**
Parasitic protozoans	**9&10**	**a/2, a/3, a/4, a/5**	**b/4, b/5, b/6**	**N//A**	**d/1, d/4, d/5**
Parasitic Nematodes	**11&12**	**a/2,a/3, a/4, a/5**	**b/4, b/5, b/6**	**N//A**	**d/1, d/4, d/5**
Parasitic Cestodes and Trematodes	**13&14**	**a/2, a/3, a/4, a/5**	**b/4, b/5, b/6**	**N//A**	**d/1, d/5, d/6**

Course coordinator: **Prof. Dr. Sabah Farouk**
Ass. Prof. Dr. Roba Mohamed Talaat
Lecturer Dr. Yasser Bastawy Mohamed

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-58	**Course Title:**	Molecular Pharmacology				
No. units	3	**Lecturers.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Applying biotechnology knowledge and integrate it with professional skills to solve the molecular biology problems (Molecular Pharmacology). 2/2- Demonstrating awareness of the ongoing problems in the surrounding environment for medicine production. 2/3- Developing academically and professionally the students' capabilities of information required for medicine evaluation and structure. 2/4- Improving and analyze the cytotoxicity of novel drugs and medicine production.

3. Intended Learning Outcomes of Course (ILO's)	
xxx. Knowledge and Understanding:	a/1 Classify main scientific advances of using the quality assurance principles in molecular biology applications on environmental diseases. a/2 Summarize the ideologies and concepts of drug content. a/3 Understand the role of natural compound and plant extraction in identification of novel drugs. a/4 Describe the molecular interaction involved in medicine influence. a/5 Recognize the mechanisms and metabolism of different drugs.
yyy. Intellectual skills:	b/1 Analyze scientific researches to solve the problems of the drug-DNA interaction and its application in controlling diseases. b/2 Plan the evidences for the critical role of plant extraction and natural compound in drug discovery. b/3 Interpret the information explain the correlation

	between drug discovery and economic outcome. b/4 Derive the skills in modern laboratory techniques for isolation and purification of chemical and natural compound de *novo*.
zzz. Practical and Professional Skills of course:	**Not Applicable (N/A)**
aaaa. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of Molecular Pharmacology. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topics**
1	Principle of drug production
2	Chemical production de *novo*
3	Effectiveness of Natural compounds
4	Cytotoxicity and metabolism of chemical medicine
5	Principle of antibiotics production
6	Viral medicine in used
7	Basic on drug discovery

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
ww. Assessment Methods:	Semester Works -Midterm Exam

	-Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	15- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 16- Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. **17-** Bower JM, Bolouri H (Eds.)(2001). Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press,
11. Suggested Books	**12. Molecular Biology of the Cell, 4^{th} edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010.** **13. Genes VIIII. Lewin. Prentice Hall, 2011**
14. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. www.prancipal genetics.

Matrix of Knowledge, Skills ILOs for Molecular Pharmacology Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Principle of drug production	**1&2**	**a/1, a/5**	**b/1**	**N/A**	**d/1, d/5**
Chemical production de *novo*	**3&4**	**a/2**	**b/1**	**N/A**	**d/1, d/6**
Effectiveness of Natural compounds	**5&6**	**a/2**	**b/2**	**N/A**	**d/2**
Cytotoxicity and metabolism of chemical medicine	**7&8**	**a/3**	**b/2**	**N/A**	**d/2**
Principle of antibiotics production	**9&10**	**a/4, a/5**	**b/3**	**N/A**	**d/3, d/7**
Viral medicine in used	**11&12**	**a/4**	**b/4**	**N/A**	**d/3**
Basic on drug discovery	**13&14**	**a/4**	**b/4**	**N/A**	**d/4, d/8**

Course coordinator: Prof. Dr. Amal Abd El Aziz
Dr. Hany Kaliel

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**B1-60**	**Course Title:**	**MOLECULAR PLANT PATHOLOGY**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identifying advance of molecular plant pathology mainly regarding interactions of plants and pathogens at the molecular level. 2/2- Developing describe the relationship between the pathogen and host 2/3- Differentiating between the agents of Non-infectious and infectious plants diseases (abiotic and biotic). 2/4- Expressing the attitudes and ethical basis in scientific research and in approach to plant pathology. 2/5- Classifying main scientific advances of using the quality assurance principles in recent approaches in disease control by genetic engineering and biotechnology.

3. Intended Learning Outcomes of Course (ILO's)	
bbbb. Knowledge and Understanding:	a/1- Describe basic facts and theories of the biotechnology use in molecular biology tolerant, control of plants pathogen. a/2- Summarize actual fundamental of ethical and legal of different pathways and signaling in defense mechanism against biotic and abiotic challenge. a/3 – Express the mechanisms regulating of gene expression biotechnology and functions of specific gene products. a/4- Classify main scientific advances of the relationship between host and their host pathogen and concepts of molecular pathology.
cccc. Intellectual skills:	b/1- Compare between the different normal and abnormal patterns of genetic materials by using different molecular biology techniques.

	b/2- Plan suitable methods for different pathogenesis related proteins (PRs) and acquired resistance (SAR). b/3- Analyze different between types of stresses (infectious and un-infectious agents, Elicitors and (SAR) b/4- Derive the genetic engineering and biotechnology using in disease control
dddd. Professional Skills of course:	c/1- analytical methods for determination and analysis experimental models of different plants diseases diagnose c/2- Execute and Appling a range of practical skills relevant to your chosen areas of genetic engineering in agriculture and disease control c/3 Calculate proteins (PRs) and resistance proteins (SAR) valuables data in journal publish c/4 – Measure the Quality written reports types of stresses (infectious and un-infectious agents, Elicitors and (SAR) using English language.
eeee. General and Transferable Skills	d/1- Communicate effectively using all methods with public, collegeous and appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given molecular plant pathology course topics. d/5- Work in teams and capable to Manage time effectively d/6- Work as team leader in situation comparable to his/her level. d/7- Learn independently and seek continuous learning in molecular plant pathology.

	4. Course Contents:
Week No.	**Topic**
1&2	Some concepts and definitions related to plant pathology
3&4	Defense mechanism in plants
5&6	Pathogenesis related proteins (PRs) and acquired resistance (SAR)
7&8	Types of stresses (infectious and un-infectious agents, Elicitors and (SAR)
9&10	The relationships between the pathogen and host & Signaling
11&12	The Gene for Gene relationship in Plant-Parasite Interactions.
13&14	Genetic engineering and biotechnology using in disease control

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Plant Responses to Environmental Stresses from Phytohormones to Genome Reorganization (1999) by Lerner. The Herbew University of Jerusalem, Givat Ram, Jerusalem, Israel. CRC Press, Marcel Dekker, INC., Basel Switzerland, pp.683-706. - Plant Signal Transduction (2002) by Scheel, D. and Wasternack, C. Oxford University Press, Series editors: Hames, B. D. and Glover, D. M., pp.26-300.
11. Suggested Books	-Molecular Plant Pathology. 2005. Dickinson, M., Second edition. -Plant Pathology, 5th edition (2009) by George N. Agrios. Academic Press | ISBN: 0120445654. -Plant Pathology (2010) by Amar Tyagi, . Anmol Publications. - Plant–Pathogen Interactions: Methods and Protocols, Edited by Pamela C. Ronald. *Department of Plant Pathology. University of California at Davis. Davis, CA.* © 2007 Humana Press Inc.999 Riverview Drive, Suite 208 Totowa, New Jersey.
12. Periodicals, Web Sites, … etc ...	http://www.hort.purdue.edu/rhodcv/hort640c/secprod http://www.pk.uni-bonn.de/ppigb/ppigb.htm http://www.cellbio.com/protocols.html

Course coordinator: Prof. Dr. Amal Ahmed Abd El- Aziz
Dr. Tamer Mohamed Roshdy
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for MOLECULAR PLANT PATHOLOGY Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Professional Skills of course	d-General and Transferable Skills
Some concepts and definitions related to plant pathology	**1&2**	**a/1, a/2**	**b/1, b/2**	**c/1, c/2, c/4**	**d/1, d/4**
Defense mechanism in plants	**3&4**	**a/1, a/2**	**b/1, b/4**	**c/1, c/2**	**d/1, d/2, d/4**
Pathogenesis related proteins (PRs) and acquired resistance (SAR)	**5&6**	**a/1, a/4**	**b/1, b/4**	**c/1, c/2**	**d/1, d/3, d/5**
Types of stresses (infectious and un-infectious agents, Elicitors and (SAR)	**7&8**	**a/1, a/3**	**b/1, b/2**	**c/1, c/4**	**d/1, d/3, d/6**
The relationships between the pathogen and host & Signaling	**9&10**	**a/1, a/3, a/4**	**b/1, b/3**	**c/2, c/3**	**d/1, d/2, d/6**
The Gene for Gene relationship in Plant-Parasite Interactions.	**11&12**	**a/1, a/3**	**b/1, b/3**	**c/1, c/2, c/4**	**d/1, d/2, d/7**
Genetic engineering and biotechnology using in disease control	**13&14**	**a/1, a/3. a/4**	**b/1, b/2, b/4**	**c/2, c/4**	**d/1, d/4, d/7**

Course coordinator: Prof. Dr. Amal Abd El-Aziz
Dr. Tamer Mohamed Roshdy
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-68	**Course Title:**	**Oncogenes**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1. Acknowledge the relationships between oncogenes and cancer. 2/2. Analyze the key physiological changes in cancer cells and the oncogenes involved in the induction of such changes 2/3. Provid a comprehensive classification of proto-oncogenes. 2/4. Demonstrating awareness of the practical application and functional genetics to be monitored of tumor suppressor gene. 2/5. Applying analytical diagnostic techniques to discover novel molecular targets for cancer therapy 2/6. Developing analytical methods and specialized knowledge and using appropriate technological instruments in experimental cancer progenitor cells and drug resistance research.

3. Intended Learning Outcomes of Course (ILO's)	
ffff. Knowledge and Understanding:	a/1. Describe basic facts and theories of the biotechnology use in molecular biology diagnosis, control of certain diseases. a/2. Divide the different categories of molecular and biochemical assays participating of apoptosis and cancer a/3. Classify main scientific advances of using the quality assurance principles of invasion and metastasis. a/4. Express the attitudes and ethical basis in scientific research of Cyclins and Checkpoints. a/5. Write list of the key physiological changes in cancer cells and oncogenes involved in the induction of such changes. a/6. Summarize actual fundamental of ethical and legal practice in the field of molecular cancer of diagnostics and molecular aspects of diseases.

gggg. Intellectual skills:	b/1. Compare between different methods of molecular alterations and induced diseases. b/2. Analyze scientific researches to solve the problems and role of molecular targets on cancer therapies. b/3. Interpret different information to solve the problems of therapy failure of cancer diseases. b/4. Derive the strategy used to study different application of cancer progenitor cells and drug resistance and miRNA. b/5. Memorize technical terms about processes tested in scientific researches in proto oncogene and oncogene.
hhhh. Practical and Professional Skills of course:	Not Applicable (N/A)
iiii. General and Transferable Skills	d/1- Communicate effectively using all methods with public, collegeous and appropriate authorities. d/2- Use information technology to improve his professional practice in internet and relative information. d/3- Practice self appraisal and determines his learning needs. d/4- Use different sources of information to obtain data for a given oncogenes course topics. d/5- Work in teams and capable to Manage time effectively d/6- Learn independently and seek continuous learning in oncogene.

	4. Course Contents:
No.	**Topics**
1	Introduction of human cell biology
2	The Cell Cycle: Cyclins and Checkpoints
3	Proto oncogene and oncogene
4	Tumor suppressor gene
5	Apoptosis and cancer
6	Role of molecular targets of cancer therapies
7	Cancer progenitor cells & drug resistance, miRNA

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- Oral Exam - Mid-Term - Assignments - Final Exam.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Aguda BD. Instabilities in phosphorylation-dephosphorylation cascades and cell cycle checkpoints. Oncogene. 2005. 6;18(18):2846-51. -Hand book of human Immunology, CRC Press (2006). - Asthagiri A, Lauffenburger D. Bioengineering Models of Cell Signaling. Annual Review of Biomedical .Engineering, 2:31-53, 2000.
11. Suggested Books	- Ruddon, K. *Cancer Biology*. 3rd edition, Oxford University Press (2011). Current Protocols in Immunology (2010) John Wiley & Sons, Inc.
12. Periodicals, Web Sites, … etc ...	-http://homepages.wmich.edu/~beuving User ID-cancerbiology; Password: chloeb - http://www-medlib.med.utah.edu/WebPath/webpath.html - http://www.cancer.gov/ Seek; "cancer information" - http://press2.nci.nih.gov/sciencebehind/ Using menu "Understanding", Read: Cancer, -Angiogenesis, The Immune Response - http://www.ncbi.nlm.nih.gov/query.figi - http://syllabus.syr.edu/BIO/tpfondy/bio501

Matrix of Knowledge, Skills ILOs for Oncogenes Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction of human cell biology	**1&2**	**a/1**	**b/1**	**N/A**	**d/1**
The Cell Cycle: Cyclins and Checkpoints	**3&4**	**a/2**	**b/1, b/5**	**N/A**	**d/1, d/6**
Proto oncogene and oncogene	**5&6**	**a/2**	**b/2**	**N/A**	**d/2**
Tumor suppressor gene	**7&8**	**a/3, a/5**	**b/2**	**N/A**	**d/2**
Apoptosis and cancer	**9&10**	**a/4, a/6**	**b/3**	**N/A**	**d/3**
Role of molecular targets of cancer therapies	**11&12**	**a/4**	**b/4, b/5**	**N/A**	**d/3, d/6**
Cancer progenitor cells & drug resistance, miRNA	**13&14**	**a/4, a/6**	**b/4**	**N/A**	**d/4, d/5**

Course coordinator: Prof. Dr. Shaden Muawia
Prof. Dr. Mohamed Elshal
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-70	**Course Title:**	Physiological genetics				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identifying and Concepts in molecular genetics/genomics with physiological applications 2/2- Applying analytical methods & specialized knowledge and using appropriate technological means in physiological genetics. 2/3- Describing the structure and function of nucleic acids, genome structure, genetic and genomic research tools, methods for identifying disease-causing mutations, regulation of gene expression 2/4- Analyzing the molecular genetics attitude on pharmacogenetics, gene therapy and ethical issues in modern genomics

3. Intended Learning Outcomes of Course (ILO's)	
jjjj. Knowledge and Understanding:	a/1 Summarize main basics & ethics of scientific researches of molecular biotechnology fields in nucleic acids structure and function. a/2 Classify the contributions of gene expression profile in molecular processes such as cell division and cell death. a/3 Describe the molecular interaction involved in genetic characterization. a/4 Recall the mechanisms of gene mutation that resulted in genetics human diseases.
kkkk. Intellectual skills:	b/1 Compare between different methods of molecular alterations and induced diseases by physiological genetics. b/2 Analyze the evidences for the critical role of gene expression in the initiation of signals transduction. b/3 Interpret the information explains the correlation between gene mutation and different human diseases.

	b/4 Derive the skills in modern laboratory techniques for isolation and identification of different gene expression at RNA and protein levels.
llll. Practical and Professional Skills of course:	c/1 Measure the physiological genetic screening programs currently in use, describe the purpose of each genetics characterization c/2 Form and select the suitable protocols required for experiments and analysis. c/3 Execute the scientific meeting required to improve skills writing significant reports and papers.
mmmm. General and Transferable Skills	d/1- Use the internet and relative information technologies to improve his/her professional practice in the field of Physiological genetics. d/2- Practice self-appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topics**
1	Original genetics
2	Genetic characterization
3	Nucleic acids structure
4	Gene expression profile
5	Gene mutation
6	Genetic diseases
7	Principle of gene therapy

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	18- Lewin B.(2006). Essential Genes. Published by Pearson Education, Inc. USA.(2006). 19- Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. 20- De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. **21-** Bower JM, Bolouri H (Eds.)(2001). Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press,
11. Suggested Books	**12. <u>Molecular Biology of the Cell</u>, 4th edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010.** **13. <u>Molecular Cell Biology</u>, 5th edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell. W.H. Freeman & Co., 2011.** **14. <u>Genes VIII</u>. Lewin. Prentice Hall, 2011**
15. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. www.prancipal genetics.

Course coordinator: Prof. Dr. Amal Abd El Aziz
Dr. Hany Kaliel

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Physiological Genetics Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Original genetics	**1&2**	**a/1**	**b/1**	**-**	**d/1**
Genetics characterization	**3&4**	**a/2**	**b/1**	**c/1**	**d/1, d/5**
Nucleic acids structure	**5&6**	**a/2**	**b/2**	**c/1, c/3**	**d/2, d/6**
Gene expression profile	**7&8**	**a/3**	**b/2**	**c/2**	**d/2, d/3**
Gene mutation	**9&10**	**a/4**	**b/3**	**c/2, c/3**	**d/3**
Genetic diseases	**11&12**	**a/4**	**b/4**	**c/3**	**d/3, d/6**
Principle of gene therapy	**13&14**	**a/4**	**b/4**	**c/3**	**d/4, d/6**

Course coordinator: Prof. Dr. Amal Abd El Aziz
Dr. Hany Kaliel
Head of Department: Prof. Dr. Ibrahim Helmy

Course Specifications

1. 1. Course information:

Course Code:	**B1-85**	**Course Title:**	**Structure and Function Relationship of Protein**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	**Master**
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Developing the ability to lead a working team and having the capability to make decisions in different professional contexts of molecular biology in Structure and Function Relationship of Protein. **2/2-** Demonstrating awareness of basic theories of the structure and function proteins. **2/3-** Expressing and appreciation of the Cell-cell interactions & Membrane transport. **2/4-** Differencing between the Intracellular protein transport **&** Transport of solutes across membranes.

3. Intended Learning Outcomes of Course (ILO's)	
nnnn. Knowledge and Understanding:	a/1- Summarize main basics & ethics of scientific researches of molecular biotechnology fields in Structure and Function Relationship of Protein. a/2- Describe the fundamental biochemical structures of the molecules and compounds essential for vital body processes in Cell skeleton. a/3- Divide the fundamental concepts of biochemistry and the technical methodology in Cell-cell interactions and Membrane transport a/4- Classify different structure of protein. a/5- Compare between different functions structure and proteins. a/6- Link between the relationship between structure and function of proteins.
oooo. Intellectual skills:	b/1- Analyze scientific researches to solve the problems of the drug-DNA interaction and its application in controlling diseases from Structure and Function Relationship of Protein. b/2- Analyze and interpret the results of molecular assays

	for better understanding and solving problems in membrane transport b/3- Compare the parameters of molecular biology with the parameters of different biological sciences in intracellular protein transport. b/4- Interpret and discuss results of analyzing Immunoproteins.
pppp. Practical and Professional Skills of course:	**Not Applicable (N/A)**
qqqq. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of protein biochemistry. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his leveled/7- Learning independently and seek continuous learning in methods in Structure and Function Relationship of Protein.

	4. Course Contents:
No.	**Topic**
1	Introduction to Amino acids **&** Protein structure
2	Purification & characterization of proteins
3	Enzymes
4	Immunoproteins
5	Cell skeleton **&** Motor proteins and movement
6	Cell-cell interactions & Membrane transport
7	Intracellular protein transport **&** Transport of solutes across membranes

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Course Notes	
10. Essential Books (Text Books)	**22-** Fundamentals of Protein Structure and Function
11. Suggested Books	**1-***Text book of Biochemistry 2- Robert Aufreiter (2009). Structure and Function of Proteins. 3- David Whitford (2005). Protein structure and functions.
12. Periodicals, Web Sites, … etc ...	1- Journal of Biological Chemistry(JBC).www.jbc.com www.biochemistryonline.com.

Course coordinator: Ass. Prof. Kalied Bassiouny
Dr. Mohamed Yonies
Dr. Aisam M. Fayed
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Structure and Function Relationship of Protein Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction to Amino acids **&** Protein structure	**1&2**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/2, d/4**
Purification & characterization of proteins	**3&4**	**a/2, a/4**	**b/2, b/3**	**N/A**	**d/1, d/3**
Enzymes	**5&6**	**a/3, a/4**	**b/2, b/4**	**N/A**	**d/1, d/4,d/7**
Immunoproteins	**7&8**	**a/1, a/3**	**b/4**	**N/A**	**d/1, d/3, d/4**
Cell skeleton **&** Motor proteins and movement	**9&10**	**a/1, a/3, a/4**	**b/1, b/4**	**N/A**	**d/1, d/5, d/6**
Cell-cell interactions & Membrane transport	**11&12**	**a/3, a/4, a/5**	**b/1, b/4**	**N/A**	**d/1, d/4, d/7**
Intracellular protein transport **&** Transport of solutes across membranes	**13&14**	**a/1, a/3. a/6**	**b/4**	**N/A**	**d/1, d/5, d/6**

Course coordinator: Ass. Prof. Kalied Bassiouny
Dr. Mohamed Yonies
Dr. Aisam M. Fayed
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**B1-89**	**Course Title:**	**Vitamin metabolism**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Developing the ability to lead a working team and having the capability to make decisions in different professional contexts in molecular biology. 2/2- Introducing the basic concepts of vitamins. 2/3- Applying analytical methods & specialized knowledge the basic concepts of the role vitamins in the human life. 2/4- Differencing between fat and water soluble vitamins in human body. 2/5- Demonstrating awareness of vitamin deficiencyiy problems.

3. Intended Learning Outcomes of Course (ILO's)	
rrrr. Knowledge and Understanding:	a/1- Describe quality standards of the practice during the analysis and determination of molecular biology in vitamin metabolism. a/2 - Define the basic concepts of the vitamin functions in human body. a/3- Classify the different classes of water- and fat- soluble vitamins. a/4- Summarize the vitamin metabolism in the body and vitamin deficiency.
ssss. Intellectual skills:	b/1- Plan Paraphrasing English technical terms processes using in scientific researches. b/2- Compare the different between classes of vitamins. b/3- Derive a suitable technique to determine the elements and trace elements. b/4- Analyze among the different effects of various vitamins. b/5- Linking between the vitamin deficiency and diet.
tttt. Practical and Professional	**Not Applicable (N/A)**

Skills of course:	
uuuu. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of vitamins metabolism. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level..

	4. Course Contents:
No.	**Topic**
1	Introduction and Definition of vitamins.
2	Assessment of malnutrition and recommended dietary allowances. Avitaminosis
3	Fat-soluble vitamins: Vitamin A, plant carotenoids; Vitamin D, synthesis in the body requires sunlight; Vitamin E, Mixtures of tocopherols; Vitamins K, Quinone derivatives and biological importance for each.
4	Water-soluble vitamins, definition and energy releasing vitamins: (Thiamin) B_1, Ribiflavin (B2), Niacin (B3), Pantothenic acid (B5), Pyridoxine (B6) and Biotin coenzymes and biological importances.
5	Hematopoietic water-soluble vitamins: Folic acid (Folacin) function and tetrahydrofolate in one C-metabolism, Vitamin B12(cobalamine**)**
6	Ascorbic acid function and biological improtance
7	Vitamin deficiency and treatment

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
xx. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
yy. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
zz. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	1. Lippincot`s Illustrated Reviews in Biochemistry,4^{nd} ed., Pamela C. Champe and Richard A.Harvey, Lippincott-Raven (2005) 2. Harper's Illustrated Biochemistry**,** Harper's Biochemistry 25th Edition By Robert K. Murray Darryl K. Granner Peter A. Mayes Victor W. Rodwell,2005.
11. Suggested Books	1.Textbook of biochemistry with clinical correlations, Thomas M. Devlin. Third Edn., Wiely Liss, A John Wiley 7 Sons INC., Publication (2010).
12. Periodicals, Web Sites, … etc ...	http://www.ncbi.nlm.nih.gov/pubmed/ http://www.emedicine.com

Course coordinator: Prof. Dr. Ibrahim Helmy
Head of the Department Council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Vitamin Metabolism Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Basic principles, Introduction, Definition of vitamins.	**1&2**	**a/1**	b/1	**N/A**	d/1
Assessment of malnutrition and recommended dietary allowances. Avitaminosis	**3&4**	**a/1**	b/2	**N/A**	d/2
Fat-soluble vitamins: Vitamin A, plant carotenoids; Vitamin D, synthesis in the body requires sunlight; Vitamin E, Mixtures of tocopherols; Vitamins K, Quinone derivatives and biological importance for each.	**5&6**	**a/2**	b3	**N/A**	d/1
Water-soluble vitamins, definition and energy releasing vitamins: (Thiamin) B_1, Riboflavin (B2), Niacin (B3), Pantothenic acid (B5), Pyridoxine (B6) and Biotin coenzymes and biological importance.	**7&8**	**a/2**	b3,d/5	**N/A**	d/3, d/5
Hematopoietic water-soluble vitamins: Folic acid (Folacin) function and tetrahydrofolate in one C-metabolism, Vitamin B12 cobalamin**)**	**9&10**	a/2	b/3	**N/A**	d/3
Ascorbic acid function and biological importance	**11&12**	a/3	b/4	**N/A**	d/2, d/4
Practical: determinations of vitamins and minerals in biological samples.	**13&14**	**a/1,a/4**	b1,b/2	**N/A**	d/1, d/3, d/5

Course coordinator: Prof. Dr. Ibrahim Helmy

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

13. Course information:							
Course Code:	C-36	**Course Title:**	**Flow Cytometry**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

14. Course Aims	
	2/1- Illustrate the basics and theory of flow cytometry. 2/2- Getting knowledge about the flow cytometry instrumentation 2/3- Providing the students with an up-to-date, detailed, and comprehensive overview of the molecular and cellular elements that are critical to development of the accurate and specific assays to measure nucleic Acid Analysis. 2/4- Design flow cytometry experiments for surface marker immunophenotyping and cancer diagnosis.

15. Intended Learning Outcomes of Course (ILO's)	
vvvv. Knowledge and Understanding:	a/1. Describe how a flow cytometer works. a/2. Define various applications of flow cytometry a/3. Classify the fundamentals of nucleic acid analysis using flow cytometry. a/4. Summarize flow cytometric methods to determine molecules involved in signal transduction and effect of their deficiency.
wwww. Intellectual skills:	b/1. Analyze scientific researches to solve the problems of the tumor and its application in controlling diseases. b/2. Plan the strategy used to the therapeutic applications of synthesis DNA in cell cycle. b/3. Interpret data of flow cytometry analysis of tumor markers and apply these areas to patient therapy. b/4. Compare different methods of immunofluorescence by cellular responses.
xxxx. Practical and Professional Skills of course:	c/1. Design flow cytometric experiments in different biological applications. c/2. Use computer tools to analyze cytometry data.

	c/3. Execute data from experiments to interpret and diagnose genetic alterations based on DNA content in human samples c/4. Adjust different methods applied in tumor markers detection.
yyyy. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of flow cytometry. d/2- Practice self-appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topic. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

	16. Course Contents:
No.	**Topic**
1	Introduction to Flow Cytometry
2	Flow cytometry instrumentation
3	Sample Preparation Protocol
4	Immunofluorescence.
5	Fundamentals of Nucleic Acid Analysis
6	Applications of flow cytometry
7	Practical Sections

17. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

18. Teaching and Learning Methods (for students with special needs)	**Not applicable**

19. Student Assessment:	
aaa. Assessment Methods:	-Semester Works -Midterm Exam

	-Oral Exam - Written (Final) Exam
bbb. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
ccc. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

20. List of References:	
21. Notes	
22. Essential Books (Text Books)	1. Abbas AK and Lichtman AH. (2006) Basic Immunology, 2nd edition (updated edition). Saunders Company. 2. Current Protocols in Immunology (2004) John Donovan and Patricia Brown Jingler Companey 3. Paul WE. (2008) Fundamental Immunology, 6th edition. Lippincott Williams & Wilkins Company.
23. Suggested Books	Cytokines in health and diseases, 5 edition (2010)
24. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED http://www.ahsl.arizona.edu/ http:// www.prospecbio.com/Cytokines/ http://www.copewithcytokines.de/

Course coordinator: Prof.Dr. Shaden Muawia
Prof. Dr. Mohamed Farouk Elshal

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Flow Cytometry Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction to Flow Cytometry	**1&2**	a/4	b/2	c /4	d/1, d/2, d/4
Flow cytometry instrumentation	**3&4**	a/4	b/4	c/3	d/1, d/3
Sample Preparation Protocol	**5&6**	a/1,a/2	b/1	c/1,c/2	d/1, d/4
Immunofluorescence .	**7&8**	a/1	b/1	c/1	d/1, d/5, d/6
Fundamentals of Nucleic Acid Analysis	**9&10**	a/1,a/3	b/1,b/3	c/2,c/4	d/1, d/4, d/5
Applications of flow cytometry	**11&12**	a/1,a/2	b/2	c/2,c/4	d/1, d/4, d/5
Practical Sections	**13&14**	a/1	b/4	c/1, c/3	d/1, d/5, d/6

Course coordinator: Prof.Dr. Shaden Muawia
Prof. Dr. Mohamed Farouk Elshal

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**C-44**	**Course Title:**	**Immunochemistry**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Preparing Master Graduate having capability of applying the basics and methodologies of scientific research used in the field of immunochemistry. 2/2- Introducing students to the advanced information about the immunochemistry. 2/3- Understanding the correlation between immunochemistry and human immune diseases. 2/4- Classifying of new immunochemical assays based on antigen antibody interactions. 2/5- Explaining the importance of immunochemistry in the diagnosis and follow up of different human diseases

3. Intended Learning Outcomes of Course (ILO's)	
zzzz. Knowledge and Understanding:	a/1. Describe basic facts and theories of the biotechnology used in field of immunochemistry. a/2. Classify different types of immunochemical assays a/3.Summarize the different mechanisms involved in immunochemical assays. a/4. Explain the important role of immunochemistry in the diagnosis of human diseases. a/5. Express how the immunochemistry can be used in the evaluation of the efficacy of certain drugs used in the treatment of different human diseases. a/6. Divide new and advanced immunochemical assays a/7. Describe the immunochemical methods that involved in the immunochemistry field

aaaaa. Intellectual skills:	b/1. Interpret different information to solve the problems of the performance of the immunochemistry toward diseases. b/2. Analyze monoclonal and polyclonal antibodies structure b/3. Integrate the information about the immunochemical assays and how can be used in the diagnosis of human diseases b/4. Plan the strategy used genes to build immune repertoire b/5. Compare between the classical and advanced immunochemical assays b/6. Compare different mechanisms of immunochemistry methods
bbbbb.Practical and Professional Skills of course:	c/1. Measure the immunochemical tools used in the field of immunochemistry c/2. Apply the immunochemistry assays in the screening of endemic human diseases c/3. Measure levels of antibodies in tested sample c/4. Execute the types of antibodies in tested sample c/5. Adjust experimental results and determine their strength and validity c/6. Form research presentations and execute computational tools and packages
ccccc. General and Transferable Skills	d/1. Use Audio & Video Means For Displaying immunochemistry d/2. Practice self appraisal and determines his/her learning needs. d/3. Use different sources of information to obtain data for a given immunochemistry course topics. d/4. Enhance the oral communications and effective contacts with students. d/5. Manage time effectively & work in teams. d/6. Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
No.	**Topic**
1	Historical background, Introduction to Immunology and immunochemistry
2	Antigens types and their nature & Immunoglobulin types
3	Production of monoclonal antibodies (hybirdoma technique)
4	Purification monoclonal and polyclonal antibodies
5	Clinical immunochemical and immunodiagnotic methods
6	SDS –PAGE and Western blotting technique
7	Immunochemical methods for protein purification and Applicable and immunochemical assays for diagnosis of different human diseases

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
ddd. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
eee. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
fff. Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	1. Abbas AK and Lichtman AH. (2006) Basic Immunology, 2^{nd} edition (updated edition). Saunders Company. 2. Paul WE. (2008) Fundamental Immunology, 6^{th} edition. Lippincott Williams & Wilkins Company.
11. Suggested Books	**1-** Delves PJ; Martin SJ; Burton DR and Roitt IM (2011) Roitt's Essential Immunology. Wiley Company
12. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED http://www.ahsl.arizona.edu/ **http://www.biology.arizona.edu/immunology/tutorials/antibody/structure.html** http://www.hhmi.org/biointeractive/immunology/vlab.html

Matrix of Knowledge, Skills ILOs for Immunochemistry Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Historical background, Introduction to Immunology and immunochemistry	**1&2**	**a/1,a2,**	**b/1,**	**c/1,c/2, c6**	**d/1, d/2, d/4**
Antigens types and their nature & Immunoglobulin types	**3&4**	**a/1,a/3,a/4,**	**b/1,b/2, b/5,**	**c/1, c/2,c/3,c6**	**d/1, d/3**
Production of monoclonal antibodies (hybirdoma technique)	**5&6**	**a/1,a/3,a/4,**	**b/1,b/3, b/4,**	**c/1, c6**	**d/1, d/4**
Purification monoclonal and polyclonal antibodies	**7&8**	**a/1,a/3,a/4,**	**b/1,b/2,b/5,**	**c/1, c/2,c/3,**	**d/1, d/5, d/6**
Clinical immunochemical and immunodiagnotic methods	**9&10**	**a/1,a/5**	**b/1,b/3**	**c/1, c6**	**d/1, d/4, d/5**
SDS –PAGE and Western blotting technique	**11&12**	**a/1,a/6**	**b/1,b/6**	**c/1, c6**	**d/1, d/4, d/5**
Immunochemical methods for protein purification and Applicable and immunochemical assays for diagnosis of different human diseases	**13&14**	**a/1,a/7**	**b/1,b/4**	**c/1, c/2,c/3, c6,**	**d/1, d/5, d/6**

Course coordinator: Prof. Dr. Samir Ali Mohamed El-Masry

Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	**C-63**	**Course Title:**	**Current Methods in Immunology**				
No. Units	**3**	**Lec.**	**2**	**App.**	**2**	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
Manipulate course topics to be aims	2/1. Applying analytical methods & specialized knowledge and using appropriate technological means in molecular biotechnology 2/2. Acquiring students to the general assays important in the field of molecular immunology. 2/3. Explaining the importance of the molecular biology assays in studying the immune system. 2/4. Demonstrating awareness of the practical application and function to be monitored. 2/5. Applying analytical the diagnostic application of some immunological assays. 2/6. Establishing a good laboratory practicing rules required to study molecular immunology. 2/7. Express the attitudes and ethical basis in scientific research and in molecular biology applications

3. Intended Learning Outcomes of Course (ILO's)	
ddddd.Knowledge and Understanding:	a/1. Summarize actual fundamental of ethical and professional practice in the field of molecular immunology of diagnostics and molecular aspects of diseases. a/2. Classify different categories of molecular and biochemical assays participating in the study of the immune response a/3. Divide the major assays used to prepare monoclonal and polyclonal antibodies. a/4. Express how prepared antibodies be purified and applied in molecular biology field. a/5. Describe the important role of lymphocyte separation and testing the lymphocyte function. a/6. Write list the different Enzyme linked immunosorbent assays (ELISA).

	a/7. Describe the methods of polymerase chain reactions (PCR) a/8. Express the attitudes and ethical basis in scientific research and in molecular biology applications
eeeee. Intellectual skills:	b/1. Interpret data evolved from various immunological assays. b/2. Analyze prepared antibodies after and before purification. b/3. Integrate the information about immune cells and how can they respond to different stimuli. b/4. Plan the strategy used to study different immune responses using suitable immune assay. b/5. Compare different Enzyme linked immunosorbent assays (ELISA) and their immunological applications. b/6. Derive different methods of polymerase chain reactions (PCR) and their application in molecular immunology field.
fffff. Practice and Professional Skills of course:	c/1. Measure the immune response tools used in the field of molecular immunology c/2. Apply the roles of safely execute experiments and general rules of immunology laboratory c/3. Execute purity of antibodies and their level in tested sample c/4. Execute the types of cultured lymphocytes and their response to various stimuli c/5. Apply ELISA and PCR in studying immune system c/5. Adjust molecular experimental results and determine their strength and validity in molecular immunology field c/6. Form research presentations and execute computational tools and packages
ggggg. General and Transferable Skills	d/1- Use Audio & Video Means For Displaying immune techniques. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given methods in immunology course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively & work in teams. d/6- Show leadership and administration skills in situation comparable to his level.

Week No.	4. Course Contents:
	Topic

1	Introduction to the general laboratory rules and good laboratory practice (GLP)
2	Buffer preparation
3	Basics of polyclonal and monoclonal antibody production
4 &5	Methods of antibody purifications
6 & 7	Assays based on antigen-antibody reaction
8	Midterm Examination
9	Introduction to cell culture
10& 11	Lymphocyte separation and proliferation
12 & 13	Specific assays for cytokine production
14	Final Examination

5. Teaching and Learning Methods	
	Lectures Class activities Discussion Presentation Reports

6. Teaching and Learning Methods (for students with special needs)	Not applicable

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Practical exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week --(13^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 10 10% 10 10% 10 10% 10 10% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	23- Antibody engineering (2nd ed) Oxford University Press. Inc (1995). **24-** Hand book of human Immunology, CRC Press (1997). **25-** Immunology methods manual (1997) Academic Press.
11. Suggested Books	**1-** Current Protocols in Immunology (2004) John Wiley & Sons, Inc.
12. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED **www.currentprotocols.com/immunology** **onlinelibrary.wiley.com** **www.amazon.com**

Course coordinator: **A**ss. Prof. Dr. Roba Mohamed Talaat
Lecturer Sheriff El-Sherbiny
Lecturer Dr. Yasser Bastawy Mohamed

Head of Department**: Prof. Dr.** Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Methods in Immunology (II) Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c- Practice and Professional Skills of course	d-General and Transferable Skills
Introduction to the general laboratory rules and good laboratory practice (GLP)	**1**	**a/1, a/8**	**b/1**	**c/2**	**d/1, d/2, d/4**
Buffer preparation	**2**	**a/8**	**b/1**	**c1, c2**	**d/1, d/2, d/4**
Basics of polyclonal and monoclonal antibody production	**3**	**a/1, a/3**	**b/1, b/2,b/4**	**c/1,c/3**	**d/1, d/2, d/3,d4,d/5, d/6**
Methods of antibody purifications	**4 & 5**	**a/1, a/4**	**b/1, b/2,b/4**	**c/1,c/3**	**d/1, d/2, d/4**
Assays based on antigen-antibody reaction	**6&7**	**a/1, a/4**	**b/1, b/2,b/4**	**c/1,c/3**	**d/1, d/2, d/5, d/6**
Midterm Examination	**8**				
Introduction to cell culture	**9**	**a/1, a/5**	**b/1, b/3,b/4**	**c/1,c/4**	**d/1, d/2, d/4, d/5**
Lymphocyte separation and proliferation	**10 & 11**	**a/1, a/5**	**b/1, b/3,b/4**	**c/1,c/4**	**d/1, d/2, d/4, d/5**
Specific assays for cytokine production	**12 & 13**	**a/1, a/6 , a/7**	**b/1,b/4,b/5, b/6**	**c/1,c/5, c/6**	**d/1, d/2, d/4, d/5, d/6**
Final Examination	**14**				

Course coordinator: **A**ss. Prof. Dr. Roba Mohamed Talaat
Lecturer Sheriff Mohsen El-Sherbiny
Lecturer Dr. Yasser Bastawy Mohamed

Head of Department**: Prof. Dr.** Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	C-68	**Course Title:**	Methods in molecular cancer biology				
No. units	3	**Lecturers.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1. Improving skills of the Master graduate in identifying molecular biology problems and using available resources to solve them & to achieve highest benefits (methods in molecular cancer biology). 2/2. Explaining the importance of the molecular cancer assays in studying the human cell biology. 2/3. Providing a comprehensive classification of microarray and SNPs MSI and polymorphism. 2/4. Comparing and identify the common activation mechanisms of normal genes to activate oncogenes. 2/5. Demonstrating awareness of the practical application and functional genetics to be monitored of tumor suppressor gene. 2/6. Applying analytical the diagnostic application of FISH as a prognostic tool for cancer.

3. Intended Learning Outcomes of Course (ILO's)	
hhhhh.Knowledge and Understanding:	a/1. Describe basic facts and theories of the biotechnology use in molecular biology diagnosis and control of certain diseases. a/2. Divide different categories of molecular and biochemical assays participating of molecular profiling. a/3. Classify main scientific advances of using the quality assurance principles of oncoproteomics. a/4. Express the attitudes and ethical basis in scientific research of some common facts about cancer. a/5. Summarize actual fundamental of ethical and legal practice in the field of methods in molecular cancer biology.

iiiii. Intellectual skills:	b/1. Compare between different methods of molecular alterations and induced diseases. b/2. Analyze scientific researches to solve the problems of molecular targets on cancer therapies. b/3. Interpret different information to solve the problems of develop the performance in the applications of therapy cancer diseases. b/4. Plan the experiments used to study different application of DNA methylation protocols. b/5. Memorize technical terms and processes used in scientific researches in oncoproteomics.
jjjjj. Practical and Professional Skills of course:	c/1. Apply analytical methods for determination and analysis experimental models of different diseases diagnose for carcinogenesis. c/2. Analyses the data from your own and other people's experiments and to interpret them in the light of published work in apoptosis and cancer. c/3. Measure purity of enzymes and their level in tested sample after therapeutic. c/4. Adjust some molecular parameters in diagnosis of diseases. c/5. Form the SNPs MSI and polymorphism in study cancer diagnostic techniques. c/6. Execute the molecular experimental results and determine their strength and validity in methods in molecular cancer biology field.
kkkkk.General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in the field of molecular cancer biology. d/2- Practice self appraisal and determines his/her learning needs. d/3- Use different sources of information to obtain data for a given course topics. d/4- Enhance the oral communications and effective contacts with students. d/5- Manage time effectively and work in teams. d/6- Show leadership and administration skills in situation comparable to his level..

	4. Course Contents:
No.	**Topics**
1	Introduction
2	Molecular profiling
3	SNPs MSI and polymorphism
4	DNA methylation protocols
5	Microarray
6	Oncoproteomics
7	FISH as a prognostic tool in cancer

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	-Aguda BD. Instabilities in phosphorylation-dephosphorylation cascades and cell cycle checkpoints. Oncogene. 2005. 6;18(18):2846-51. -Hand book of human Immunology, CRC Press (2006). - Asthagiri A, Lauffenburger D. Bioengineering Models of Cell Signaling. Annual Review of Biomedical .Engineering, 2:31-53, 2000.
11. Suggested Books	- Ruddon, K. *Cancer Biology*. 3rd edition, Oxford University Press (2011). Current Protocols in Immunology (2010) John Wiley & Sons, Inc.
12. Periodicals, Web Sites, … etc ...	-http://homepages.wmich.edu/~beuving User ID-cancerbiology; Password: chloeb - http://www-medlib.med.utah.edu/WebPath/webpath.html - http://www.cancer.gov/ Seek; "cancer information" - http://press2.nci.nih.gov/sciencebehind/ Using menu "Understanding", Read: Cancer, -Angiogenesis, The Immune Response - http://www.ncbi.nlm.nih.gov/query.figi - http://syllabus.syr.edu/BIO/tpfondy/bio501

Course Name	Methods in molecular cancer biology
Course Code	C-68

Course coordinator: Prof.Dr. Shaden Muawia
Dr. Manal El Hamshary
Head of the department council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Methods in molecular cancer biology Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Introduction	**1&2**	**a/1**	**b/1**	**c/3**	**d/1**
Molecular profiling	**3&4**	**a/2**	**b/1, b/5**	**c/1**	**d/1, d/6**
SNPs MSI and polymorphism	**5&6**	**a/2**	**b/2**	**c/1, c/4**	**d/2**
DNA methylation protocols	**7&8**	**a/3, a/5**	**b/2**	**c/2, c/5**	**d/2**
Microarray	**9&10**	**a/4**	**b/3**	**c/2, c/6**	**d/3**
Oncoproteomics	**11&12**	**a/4**	**b/4, b/5**	**c/3**	**d/3, d/6**
FISH as a prognostic tool in cancer	**13&14**	**a/4, a/5**	**b/4**	**c/4, c/6**	**d/4, d/5**

Course coordinator: Prof. Dr. Shaden Muawia
Prof.Dr. Mohamed Elshal
Head of Department: Prof. Dr. Ibrahim Helmy

Course Specifications

1. Course information:

Course Code:	**C-73**	**Course Title:**	**Methods in Hematology C-73**				
No. units	3	**Lec.**	2	**App.**	2	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- The students, on completion of the course, will be able to know **Basis of Hematology and** help students to understand from doing Blood Counting to Read the detail of the blood film (Normal or with any Changes or diseases). 2/2- The detail of Clotting Factors, with Intrinsic and Extrinsic effects. 2/3- Comparing between Types of anemia's and RBCs Changes. 2/4- Staining of different Blood Films and blood slides

3. Intended Learning Outcomes of Course (ILO's)	
lllll. Knowledge and Understanding:	a/1- Describe basic facts and details of molecular Hematology. a/2- Summarize main basics & Recent scientific researches of versatility of blood Diseases. a/3- Express the principles and concepts of Reading Blood Film. a/4- Classify the relationship between Shape of blood cell and the types of Anemia's. a/5- Divide the mechanisms regulating blood Clotting and the blood diseases (Like Hemophilia and Purpra). a/6- Summarize the fundamental Hematological Determination of the blood changes with different stains and diseases.

	4. Course Contents:
Week No.	**Topic**
1&2	Blood Sample Withdrawal and Blood Film Spreading.
3&4	Staining Normal blood films from donors.
5&6	Reading Normal and Abnormal blood films with RBCs count, WBCs Count and WBCs Differential Count.
7&8	Hematological testes (Bleeding time, Clotting time, Hb%, Prothrombin time)
9&10	Demonstrating blood Parasites in Ready Films.
11&12	Demonstrating blood Anemia's cell shape in ready films.
13&14	Demonstrating WBCs Leukemia's (Acute and Chronic).

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
ggg. Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
hhh. Assessment Schedule	- (5^{th} to10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
iii. Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	• Clinical Laboratory Standards Institute. Reference and Selected Procedures for the Quantitative Determination of Hemoglobin in Blood: Approved Standard-Third Edition. CLSI document H15-A3. • Clinical Laboratory Standards Institute. Procedure for Determining Packed Cell Volume by the Microhematocrit Method: Approved Standard-Third Edition. CLSI document H07-A3
9. Notes	
10. Essential Books (Text Books)	-Williams **Manual of Hematology**, Eighth Edition: 8580000934953 ... *https://www.amazon.com/Williams-Manual-Hematology-Marshall-Lichtman/dp/007162242*
11. Suggested Books	**Practical Manual of Haematology** - JaypeeDigital | BookDetail *https://www.jaypeedigital.com/Book/BookDetail?isbn=9788180618864*
d -Periodicals, Web Sites, … etc ...	http://www.ncbi.nlm.nih.gov/books http://bcs.whfreeman.com/lodishe

Course Name	**Methods in hematology**
Course Code	**C-73**

Coordinator: Prof.Dr. Sabah Farouk
Head of Department: Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular biology I Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Professional Skills of course	d-General and Transferable Skills
Introduction and perspective.	**1&2**	**a/2,**	**b/1**	**c/1**	**d/3**
Blood Sample Withdrawal and Blood Film Spreading.	**3&4**	**a/2,a/4**	**b/2**	**c/3**	**d/1,d/2,d/4**
Staining Normal blood films from donors.	**5&6**	**a/2,a/3**	**b/3**	**c/2**	**d/1,d/5,d/4**
Reading Normal and Abnormal blood films with RBCs count, WBCs Count and WBCs Differential Count	**7&8**	**a/2**	**b/2**	**c/3,c/4**	**d/1,d/3**
Hematological testes (Bleeding time, Clotting time, Hb%, Prothrombin time)	**9&10**	**a/2**	**b/3**	**c/3**	**d/1,d/2,d/4**
Demonstrating blood Parasites in Ready Films.	**11&12**	**a/1,a/4,a/6**	**b/3**	**c/3**	**d/2,d/4**
Demonstrating blood Anemia's cell shape in ready films And Leukemia (Acute and Chronic).	**13&14**	**a/3,a/4, a/5**	**b/1, b/2**	**c/3**	**d1,d5**

Coordinator: Prof.Dr. Sabah Farouk
Head of Department: Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:

Course Code:	C101	**Course Title:**	Practical concepts of PCR assays				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master's
Department	**Molecular Biology**						

2. Course Aims	
	1- Enable student to know the basic practical concepts of PCR assays. 2- Familiarize students with various applications of PCR technique in research and molecular diagnosis. 3- Help students to gain practical and professional skills to perform PCR experiments. 4- Make students oriented with troubleshootings of PCR experiments.

3. Intended Learning Outcomes of Course (ILO's)	By the end of the study of this course students will be able to:
mmmmm. Knowledge and Understanding:	a/1- Express major innovations that led to development of the PCR assay. a/2- Summarize laboratory requirements of PCR experiments. a/3- Describe basic principles of PCR technique. a/4- Classify different formats of the PCR assay. a/5- Describe procedures applied for identification of PCR products. a/6- Summarize some practical approaches of PCR assay in routine molecular diagnosis. a/7- Express research applications of PCR assays. a/8- Divide practical and technical problems of PCR experiments.

nnnnn.Intellectual skills:	b/1- Interpret different formats of the PCR assay. b/2- Compare different methods of verify PCR products. b/3- Analyze practical applications of PCR assays in research and molecular diagnosis. b/4- Interpret results of PCR experiment. b/5- Derive practical and technical problems encountered with PCR experiments. b/6- Plan for PCR experiments.
ooooo. Practical and Professional Skills of course:	c/1- Apply appropriate format of PCR assay for molecular diagnostic purposes. c/2- Adjust optimized PCR reactions. c/3- Execute methods used to identify PCR products.
ppppp.General and Transferable Skills	d/1- Use different scientific data resources (text books, journals, periodicals and internet web sites) to gain scientific knowledge and data. d/2- Work in teams and lead work teams in different professional contexts d/3- Practice independent learning and seek continuous learning.

	4. Course Contents:
No.	**Topic**
1	PCR: Introduction, environment and basic principles
2	PCR assays
3	Identification of PCR products
4	Applications of PCR assays
5	Optimization of the PCR
6	PCR: Troubleshootings
7	Practical PCR: setting up PCR lab, experiment and electrophoresis of PCR product DNA

5. Teaching and Learning Methods	
	- Lectures - Laboratory sessions - Internet resources

6. Teaching and Learning Methods (for students with special needs)	**Not applied**

7. Student Assessment:	
Assessment Methods:	- Oral Exam …… to assess general and transferable skills, intellectual skills, understanding & knowledge. - Written Exam……. to assess intellectual skills, understanding & knowledge. - Practical Exam…. to assess practical skills.
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 15 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	- Lecture notes
10. Essential Books (Text Books)	- Polymerase chain reaction (PCR): the technique and its application, 1993. Eeles and Stamps. R.G. Landes Company, Austin,Texas.
11. Suggested Books	
12. Periodicals, Web Sites, … etc ...	- www.en.wikipedia.org/wiki/pcr - www.dnalc.org/dnalc/resources/pcr

Course Title	**Practical approach in PCR**
Course Code	**C-101**

Course Coordinator: Prof. Dr. Mohamed El-Shahat
Head of Department: Prof. Dr. Ibrahim Helmy

Course Matrix

Week No.	Topic	a- Knowledge and Understanding	b- Intellectual skills	c- Practical and Professional Skills	d- General and Transferable Skills
1, 2	PCR: Introduction, environment and basic principales	1, 3, 6			2
3, 4	PCR assays	4, 5	1	1	2
5,6	Identification of PCR products	5	2		2
7,8	Applications of PCR assays	6, 7	3		2
9, 10	Optimization of the PCR	8			2
11, 12	PCR: Troubleshooting's	8	5		2
13, 14	Practical PCR: setting up PCR lab, experiment and electrophoresis of PCR product DNA		2, 4, 5, 6	1, 2, 3	1, 2, 3

Course Coordinator: Prof. Dr. Mohamed El-Shahat
Head of Department: Prof. Dr. Ibrahim Helmy

Department: Molecular Biology

Course Specifications

1. Course information:

Course Code:	B5- 25	**Course Title:**	**Immunoproteins**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Master
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Improving skills of the Master graduate in identifying different cytokines, their structure and function differences using available resources to understand their cascades and to achieve highest benefits in evaluating the expected immunity. 2/2- Getting knowledge about the structure and functions of different cytokines and how to regulate their production and interaction between different cytokines. 2/3- Summarizing the cross-linking relationship between cytokines and their role in different human diseases. 2/4- Providing the students with an up-to-date, detailed, and comprehensive overview of the molecular and cellular elements that are critical to development of the accurate and specific assays to measure cytokines.

3. Intended Learning Outcomes of Course (ILO's)	
qqqqq.Knowledge and Understanding:	a/1. Describe basic facts and theories of the biotechnology use in cytokine researches and their possible role in the control of certain diseases a/2. Divide cytokines depending on different methods of cytokine classification and implication of various nominates. a/3. Classify cytokine receptor families, their features and expression on various cells. a/4. Summarize molecules involved in signal transduction and effect of their deficiency. a/5. Express the role of cytokines in cellular and humoral immune responses. a/6. Explain the therapeutic applications of cytokines in some diseases. a/7. Write list specific assays that could be used to measure cytokine secretion, expression and defects.

rrrrr. Intellectual skills:	b/1. Analyze scientific researches to solve the problems of the cytokine interactions and its application in controlling diseases. b/2. Plan the strategy used to by cytokines in improving signal transduction. b/3. Interpret cytokines and cytokine receptors on genomics and proteomics, and apply these areas to patient therapy. b/4. Compare different cytokines participating in humoral and cellular responses b/5. Drive the fundamental mechanisms underlying immunologic diseases and the principles for therapeutic modulation of the immune system on view of cytokine characteristics. b/6. Compare different cytokines detection methods
sssss. General and Transferable Skills	c/1. Use Audio & Video Means for Displaying immune cells and organs. c/2. Practice self-appraisal and determines his/her learning needs. c/3. Use different sources of information to obtain data for a given immunology course topic. c/4. Enhance the oral communications and effective contacts with students. c/5. Manage time effectively & work in teams. c/6. Show leadership and administration skills in situation comparable to his level.

	4. Course Contents:
Week No.	**Topic**
1	Introduction to cytokines
2	Classification of different cytokine receptor families
3	TNF alpha receptor
4	TGF beta receptor
5	Cytokine signal transduction (JAK-STAT and G protein)
6	Cytokine related disease
7	Mid Term Examination
8	Cytokines and cellular immunity
9	Cytokines and humoral immunity
10	Cytokines and Cancer
11	Cytokines and autoimmune disease
12	Application of cytokines in therapy
13	Cytokines in health and disease (open discussion)

14	Final Examination

5. Teaching and Learning Methods	
	Lectures **Class activities** **Discussion** **Presentation** **Reports**

6. Teaching and Learning Methods (for students with special needs)	**Not applicable**

7. Student Assessment:	
Assessment Methods:	-Semester Works -Midterm Exam -Oral Exam - Written (Final) Exam
Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
Weighting of Assessments	Degrees % 10 10% 10 10% 20 20% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	1. Abbas AK and Lichtman AH. (2006) Basic Immunology, 2nd edition (updated edition). Saunders Company. 2. Current Protocols in Immunology (2004) John Donovan and Patricia Brown Jingler Companey 3. Paul WE. (2008) Fundamental Immunology, 6th edition. Lippincott Williams & Wilkins Company.
11. Suggested Books	Cytokines in health and diseases, 5 edition (2010)
12. Periodicals, Web Sites, … etc ...	WWW.NCBI.NLM.NIH.GOV/PUBMED http://www.ahsl.arizona.edu/ http:// www.prospecbio.com/Cytokines/ http://www.copewithcytokines.de/

Course Name	**Immunoproteins**
Course Code	**B5-25**

Course coordinator: Ass. Prof. Dr. Roba Mohamed Talaat
Lecturer: Dr. sheriff Mohsen El-Sherbiny
Lecturer: Dr. Yasser Bastawy Mohamed

Head of the department council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Immunoproteins Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-General and Transferable Skills
Introduction to cytokines	**1**	a/1,a/2	b/1	c/1, c/2, c/4
Classification of different cytokine receptor families	**2&3&4**	a/1,a/3	b/1,b/3	c1, c/3
Cytokine signal transduction and diseases (JAK-STAT and G protein)	**5**	a/1,a/4	b/1,b/2	c/1, c/4
Cytokines related disease	**6**	a/1,a/6	b/1,b/4	
Mid Term Examination	**7**			
Cytokines and cellular immunity	**8**	a/1,a/5	b/1,b/4	c/1, c/5, c/6
Cytokines and humoral immunity	**9**	a/1,a/5	b/1,b/4	c/1, c/4, c/5
Cytokine and cancer	**10**	a/1,a/6	b/1,b/4	
Cytokines and autoimmune	**11**	a/1,a/6	b/1,b/4	
Application of cytokines in therapy	**12**	a/1,a/6	b/1,b/4	c/1, c/4, c/5
Cytokine in health and disease	**13**	a/1,a/7	b/1,b/6	c/1, c/5, d/6
Final Examination	**14**			

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