Department of Molecular Biology

Program for Doctorate Postgraduate Studies of Molecular Biology

CONTENTS

Academic Reference Standards (ARS), NAQAAE (2009)

Academic Reference Standards (ARS) for Doctorate Postgraduate Studies, NAQAAE, March 2009

1- Graduate Attributes

The graduate of Doctorate program of any specialty must be able to:

1.1. Master basics and methodologies of molecular biology scientific research.
1.2. Add to the knowledge in the molecular biology field.
1.3. Apply analytical and critical approach to the knowledge in molecular biology and related areas.
1.4. Integrate molecular biology knowledge with relevant knowledge by extrapolating and developing relations between the two interfaces.
1.5. Show in depth awareness of recent theories and ongoing problems in the molecular biology fields.
1.6. Identify professional problems and find innovative solutions.
1.7. Master a wide range of professional skills in the molecular biology area.
1.8. Work towards the development of new methods, tools and procedures in professional practice.
1.9. Use appropriate technological means to serve his/her professional practice.
1.10. Communicate effectively and lead team-work in different professional contexts.
1.11. Make decisions according to available information of molecular biology.
1.12. Employ available resources efficiently and work to find and develop new resources.
1.13. Show awareness of his/her role in community development of molecular biology.
1.14. Reflect the commitment to integrity and credibility of the profession and its rules
1.15. Commit him/herself to continuous self-development and to transfer knowledge and experience to others

2- General academic standards:

2.1. Knowledge & Understanding:

By the end of Doctorate program of any specialty, the graduate must have deep knowledge & understanding of:

2.1.1. Basic facts, theories and recent advances of the molecular biology and related subjects.
2.1.2. Basics, methodologies and scientific research ethics as its different tools.
2.1.3. Ethical and legal principles of professional practice.
2.1.4. Quality standards of professional practice.
2.1.5. Knowledge related to the professional practice impact on the molecular biology and conservation.

2.2. Intellectual skills:

By the end of the Doctorate program study in any specialty, the graduate must be able to:

2.2.1. Analyze, evaluate and deduce the information in the molecular biology fields.
2.2.2. Solve the specialized problems according to available data.
2.2.3. Conduct research studies that add to molecular biology knowledge.

2.2.4. Write and publish scientific articles.
2.2.5 Evaluate professional practice risks.
2.2.6. Plan to improve molecular biology performance.
2.2.7. Take decisions in various professional situations including dilemmas and controversial issues.
2.2.8. Add to the molecular biology field through creativity & innovation.
2.2.9. Manage discussions on basis of evidence and proofs.

2.3. Professional skills:

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

2.3.1. Master basic and advanced professional skills in the molecular biology field.
2.3.2. Write and appraise professional reports.
2.3.3. Evaluate and improve methods and tools used in the molecular biology.
2.3.4. Use technological tools to serve professional practice.
2.3.5. Plan for professional practice development and performance of others.

2.4. General & transferable skills:

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

2.4.1. Communicate effectively using different means.
2.4.2. Use information technology to improve professional practice.
2.4.3. Teach and evaluate others.
2.4.4. Perform self appraisal and seek continuous learning.
2.4.5. Use different resources to obtain information and knowledge.
2.4.6. Work in and lead a team.
2.4.7. Manage scientific meetings and time.

Program Academic Reference Standards (ARS)

Program Reference Academic Standards

1. Program Graduate Attributes

The graduate of the program must be able to:

1.1. Master basics and methodologies of scientific research in the field of molecular biology.
1.2. Add to the knowledge in the field of biomarker discovery and molecular biology.
1.3. Apply analytical and critical approach to the knowledge in specialty and related areas.
1.4. Integrate specialized knowledge with relevant knowledge by extrapolating and developing relations between the two interfaces
1.5. Show in depth awareness of recent theories and ongoing problems in the field of molecular biology.
1.6. Identify professional problems and find innovative solutions.
1.7. Master a wide range of professional skills in the specialty area.
1.8. Work towards the development of new methods, tools and procedures in professional practice.
1.9. Use appropriate technological means to serve his/her professional practice.
1.10. Communicate effectively and lead team-work in different professional contexts.
1.11. Make decisions according to available information.
1.12. Employ available resources efficiently and work to find and develop new resources.
1.13. Show awareness of his/her role in community development and environmental conservation.
1.14. Reflect the commitment to integrity and credibility of the profession and its rules
1.15. Commit him/herself to continuous self-development and to transfer knowledge and experience to others

Program Academic standards:

3.1 Knowledge & Understanding

After the end of Doctorate Program Graduate must be able to Understand & awareness for all of:

3.1.1 Theories and Basic of modern of knowing in the field of molecular biology.
3.1.2 Basics, methodologies and scientific researches ethics and its different tools.
3.1.3 Ethical and legal principles for professional practice in the fields of molecular biology.
3.1.4 Quality principals & basics in professional practice in the fields of molecular biology.
3.1.5 Ethical consideration in the field of interest scientific researches.
3.1.6 Knowledge relevant with the effect of his professional practice on environmental and its developing and maintenance.

3.2 Intellectual Skills

After the end of Doctorate program, Graduate must be able to:

3.2.1 Analysis, evaluation information in the field of molecular biology and measuring on it and attaining form it.
3.2.2 Solve specialized problems according to available data.
3.2.3 Implement researches studies adding to knowledge.
3.2.4 Formulate scientific papers.
3.2.5 Evaluation Risks in professional practice.
3.2.6 Plan for developing performance in the field of molecular biology.

3.2.7 Make professional decisions in different professional contexts.
3.2.8 Innovate /create novel approaches in the field of molecular biology.
3.2.9 Discuss/Dialogue based on evidence and indexes.

3.3. Professional and Practical skills

After the end of Doctorate program, Graduate must be able to:

3.3.1 Master modern and basic professional skills in the fields of molecular biology.
3.3.2 Write and evaluate professional reports.
3.3.3 Evaluate and develop methods & tools based on the field of molecular biology.
3.3.4 Use technology tools for serving professional practice.
3.3.5 Plan for developing professional practice and improvement performance of other.

3.4. General & Transferable skills

After the end of Doctorate program, Graduate must be able to:

3.4.1 Implement Active Communication with different types.
3.4.2 Use information technology for serving Developing professional practice.
3.4.3 Educate others and evaluate their performance.
3.4.4 Implement self- evaluation & continuous learning.
3.4.5 Use different resources for obtaining information & knowledge.
3.4.6 Work in team and lead team-works.
3.4.7 Manage Scientific meetings and ability on Time management.

Matrix between Graduate Attributes of the Program and Graduate Attributes for NAQAAE

Program Graduate Attributes	Graduate Attributes from NAQAAE														
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15
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			
1.13													X		
1.14														X	
1.15															X

Matrix Between Program ARS and ARS for NAQAAE

2.1 Knowledge & Understanding

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

2.2. Intellectual Skills

ARS	ARS NAQAAE								
	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9
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		
3.2.8								X	
3.2.9									X

2.3.1 Professional Skills

ARS	ARS NAQAAE				
	2.3.1	2.3.2	2.3.3	2.3.4	2.3.5
3.3.1	X				
3.3.2		X			
3.3.3			X		
3.3.4				X	
3.3.5					X

2.3.2 General and Transferable skills

ARS							
	2.4.1	2.4.2	2.4.3	2.4.4	2.4.5	2.4.6	2.4.7
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

Molecular Biology Doctorate Program Specification 2015/2016

Doctorate Program Specification
(2015/2016)

A-Basic Information

1- Program title: **Molecular Biology Doctorate**

2. Program type: Single √ Double Multiple

3- Department: Molecular Biology

4- Program Approval Date: 19/09/2015

B- Professional Information:

1- Program aims:

Preparation of Doctorate graduate capable to:

1.1. Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology (Molecular Parasitology, Molecular Immunology, Molecular Pathology, Molecular Cell Biology, Molecular Genetics and Cytogenetic, Molecular Cancer Biology, Biochemistry and Molecular Biology, Molecular Entomology, Molecular Taxonomy, Molecular Evolution, Genomics, Tissue Engineering, Molecular Microbiology, Molecular Human Genetics).

1.2. Writing papers in molecular biology and using data display devices, publishing tool at scientific conferences.

1.3. Managing research team-work and setting research rules for diploma and master graduates needs.

1.4. Understanding independent research system (input – process-output) and supervising scientific and research works.

1.5. Decision making in determining research points, answering questions in scientific seminars, admitting research plans.

1.6. Simplifying research points to set them into educational curricula in molecular biology department.

1.7. Showing recommendations and awareness to Sadat's community's problems.

1.8. Communicating with international scientific journals for paper publishing.

2- Intended learning outcomes (ILOs):

2/1 Knowledge and understanding:

At the end of this program, the graduate must be able to:

a- Recognize difference the principles and concepts of genetics, genetic engineering and molecular biology with medical biotechnology.

b – Explain the mutual links between chemistry and structure of biological macromolecules and the relationship between structure and function.

c – Describe structure and functions of the different organelles of living cell

d- Summarize the properties the of macromolecules in biochemistry such as hormones, proteins, enzymes and nucleic acids.

e – Differentiate between the biochemical structures of different molecules and compounds essential for vital body processes.

f- Acknowledge the main quality standards of the practical analyses molecular cancer, Immunogenetics and gene regulation of human pathology

g- Recognize the basics and ethics of scientific researches in the fields of molecular biology.

h- Summarize the procedures used in both qualitative and quantitative biological analysis.
i- Express the recent theories, methodologies, tools and ethics of scientific research used in molecular biology field.

2/2 Intellectual abilities:

At the end of this program, the graduate must be able to:

a- Discover innovative or enhance current methods used for molecular cancer biology and biochemistry.
b- Evaluate and determine the data obtained in the fields of molecular biology to benefit from it in taking beneficial recommendations and conclusions.
c- Interpret results of different techniques of molecular immunology and experimental biochemistry.
d- Design different information to solve the problems of immune response and chemotherapy.
e- Distinguish between the different aspects of molecular pathology and molecular human genetic.
f- Determine problems in the scientific researches of the molecular cancer biology and molecular cell biology.
g- Find solution to the risks imposed during the treatment and analysis of molecular diagnostic diseases techniques.
h- Evaluate professional decision taking for applications of genetic engineering in agriculture and medicine biotechnology.
i- Improve good scientists writing approaches for preparing scientific research papers.

2/3. Professional and practical Skills:

At the end of this program, the graduate must be able to:

a – Test the different analytical methods for analysis in molecular biology.
b – Plan research projects that will normally include laboratory experiments.
c – Implement suitable methods and tools of molecular biology for obtaining accurate results.
d – Prepare reports about research analyses in molecular biology.
e- Use technological tools in the professional practice.
f- Test the professional practice and the performance of others.
g- Prepare techniques and tools used in molecular biology.

2/4. General and transferable Skills:

At the end of this program, the graduate must be able to:

a- Work in team and effectively communicate with public, collegeous and appropriate authorities.
b- Show management skills for using information technology to improve his professional practice in internet and relative information.
c- Practice efficiency computer's software to determine his learning needs.
d- Use different sources of information to obtain data for a given course topic.
e- Communicate with others and manage time effectively.
f- Show self learning abilities in situation comparable to his level.
g- Use audio and video means for displaying information to learn independently and seek continuous learning in molecular biology.

3- Program Academic standards:

Department council prepared program academic reference standards (ARS) according to NAQAAE Academic reference standard (March 2009)

4- Bench Marks:

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

5- Curriculum Structure and Contents:

a. Program duration: not exceed 3 years

b. Program structure:

No. of hours/units:

Lectures	35	Lab./ Exercise	18	Total	53
Compulsory	17	Optional	-----	Elective	17

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

- Practical (Thesis) — The time spent in achievement of a thesis(8 hrs/week)

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

a- Compulsory:

Code No.	Course Title	No. of Units	No. of hours/week			Year /Level	Semester
			Lect.	Ex.	App.		
	German language	3	3	-		1	1
A-80	Computer	3	2	2		1	1
	Research and research methodology	6	3	-		1	2
B1-94	Special topics	3	3	-		1	2
B1-95	Seminars	3	---	6		2	1
B1-2	Advanced molecular genetic	3	3			2	1
A-24	Advanced biotechnology	3	3	-		2	2
	Total	24	17	6			

b- Elective:

Code No.	Course Title	No. of Units	No. of hours/week			Year/ Level	Semester
			Lect.	Ex.	App.		
A-50	Immunogenetics	3	3				
B1-1	Advanced general and molecular virology	3	3				
B1-4	Aging (molecular approach)	3	3				
B1-19	Gene regulation in eukaryotes	3	3				
B1-20	Genetic control of insects	3	3				
B1-30	Medical biotechnology	3	3				
B1-37	Molecular biology of insects and insect viruses	3	3				
B1-47	Molecular evaluation	3	3				
B1-53	Molecular human pathology	3	3				

B1-61	Molecular structure of human chromosomes	3	3				
B1-62	Molecular taxonomy	3	3				
B1-64	Mutagenesis and carcinogenesis	3	3				
B1-71	Physiological and biochemical host pathogen relationship	3	3				
B1-73	Plant genetic transformation	3	3				
B1-76	Plasmid, recombinant DNA and genetic engineering	3	3				
B1-86	Techniques for the analysis of complex genomes	3	3				
C-27	Experimental biochemistry	3	2	2			
C-43	Human cancer (practical approach)	3	2	2			
C-81	Methods in protein analysis	3	2	2			
C-64	methods Immunology 111	3	2	2			
C-75	Methods in molecular parasitology	3	2	2			
B5-32	Monoclonal antibodies	3	3				

c. PhD dissertation (at least three academic years)

All PhD-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 Department of Molecular Biology 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.

6. Programme admission requirements:

- Bachelor degree from appropriate practical faculty from Egyptian or an equivalent university with general grade "GOOD".
- Master's degree from the GEBRI institute or from recognizable equivalent one.

7- Regulations for progression and program completion:

- Successful completion of the required courses (equivalent to at least18 units content 6 elective courses) in addition to compulsory courses: German language, advanced computer, Research and research, 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

- Successfully passes of both oral and written qualifying examinations.
- Approved completion of the research experiments.
- Approved scientific writing of Ph.D. dissertation.
- Successfully passes of dissertation open defense examination.

8- Assessment methods for Evaluating Program Students:

No.	Method	Intended Learning Outcomes ' ILO's '
1	**Semester Works(5th&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	**PhD dissertation and oral presentation**	To assess the ability to write a review of literature, 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

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	Staff	Questionnaire	---------

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

Program Coordinator: **Prof. Dr. Adel Guirguis**

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix Between Program ILO's and Courses

Matrix of Knowledge, Skills of Molecular Biology Doctorate Program Targeted

No.	Course No.	Course title	Knowledge and understanding skills								
			a	b	c	d	e	f	g	h	i
1		German language									X
2		Research and research methodology				X					
3	A-24	Biotechnology II	X								
4	A-81	Computer II									X
5	B1-2	Advanced molecular genetic	X								
6	B1- 94	Special topics								X	
7	B1- 95	Seminars						X			
8	**A-50**	Immunogenetics					X				
9	**B1-1**	Advanced general and molecular virology		X							
10	**B1-4**	Aging (molecular approach)				X					
11	B1-19	Gene regulation in eukaryotes	X								
12	**B1-20**	Genetic control of insects							X		
13	B1-30	Medical biotechnology		X							
14	**B1-37**	Molecular biology of insects and insect viruses							X		
15	**B1-47**	Molecular evaluation									X
16	**B1-53**	Molecular human pathology						X			
17	**B1-61**	Molecular structure of human chromosomes								X	
18	B1-62	Molecular taxonomy									X
19	B1-64	Mutagenesis and carcenogenesis			X						
20	B1-71	Physiological and biochemical host pathogen relationship		X							
21	B1-73	Plant genetic transformation	X								
22	B1-76	Plasmid, recombinant DNA and genetic engineering	X								
23	B1-86	Techniques for the analysis of complex genomes								X	
24	C-27	Experimental biochemistry									X
25	**C-43**	Human cancer (practical approach)					X				
26	**C-81**	Methods in protein analysis				X					
27	**C-64**	methods Immunology 111			X						
28	**C-75**	Methods in molecular parasitology	X								
29	**B5-32**	Monoclonal antibodies		X							

No.	Course No.	Course title	Knowledge and understanding skills								
			a	b	c	d	e	f	g	h	i
PhD dissertation			X	X	X	X	X	X	X	X	X

No.	Course No.	Course title	Intellectual skills								
			a	b	c	d	e	f	g	h	i
1		German language									X
2		Research and research methodology					X				
3	A-24	Biotechnology II								X	
4	A-81	Computer II									X
5	B1-2	Advanced molecular genetic		X							
6	B1- 94	Special topics			X						
7	B1- 95	Seminars							X		
8	**A-50**	Immunogenetics			X						
9	**B1-1**	Advanced general and molecular virology	X								
10	**B1-4**	Aging (molecular approach)		X							
11	B1-19	Gene regulation in eukaryotes								X	
12	**B1-20**	Genetic control of insects		X							
13	B1-30	Medical biotechnology				X					
14	**B1-37**	Molecular biology of insects and insect viruses		X							
15	**B1-47**	Molecular evaluation								X	
16	**B1-53**	Molecular human pathology							X		
17	**B1-61**	Molecular structure of human chromosomes									X
18	B1-62	Molecular taxonomy								X	
19	B1-64	Mutagenesis and carcinogenesis							X		
20	B1-71	Physiological and biochemical host pathogen relationship				X					
21	B1-73	Plant genetic transformation								X	
22	B1-76	Plasmid, recombinant DNA and genetic engineering					X				
23	B1-86	Techniques for the analysis of complex genomes						X			
24	C-27	Experimental biochemistry		X							
25	**C-43**	Human cancer (practical approach)	X								
26	**C-81**	Methods in protein analysis									X
27	**C-64**	methods Immunology 111			X						
28	**C-75**	Methods in molecular parasitology		X							

No.	Course No.	Course title	Intellectual skills								
			a	b	c	d	e	f	g	h	i
29	**B5-32**	Monoclonal antibodies				X					
PhD dissertation			X	X	X	X	X	X	X	X	X

No.	Course No.	Course title	Professional and Practical Skills						
			a	b	c	d	e	f	g
1		German language					X		
2		Research and research methodology	X						X
3	A-24	Biotechnology II			X			X	
4	A-81	Computer II				X			
5	B1-2	Advanced molecular genetic		X					X
6	B1- 94	Special topics		X					
7	B1- 95	Seminars	X						
8	**A-50**	Immunogenetics			X			X	
9	**B1-1**	Advanced general and molecular virology		X					X
10	**B1-4**	Aging (molecular approach)	X						
11	B1-19	Gene regulation in eukaryotes					X		
12	**B1-20**	Genetic control of insects			X				
13	B1-30	Medical biotechnology				X			X
14	**B1-37**	Molecular biology of insects and insect viruses			X				
15	**B1-47**	Molecular evaluation					X		
16	**B1-53**	Molecular human pathology	X					X	
17	**B1-61**	Molecular structure of human chromosomes		X					X
18	B1-62	Molecular taxonomy I				X			
19	B1-64	Mutagenesis and carcinogenesis			X				
20	B1-71	Physiological and biochemical host pathogen relationship	X						X
21	B1-73	Plant genetic transformation					X		
22	B1-76	Plasmid, recombinant DNA and genetic engineering					X		
23	B1-86	Techniques for the analysis of complex genomes			X				X
24	C-27	Experimental biochemistry	X						
25	**C-43**	Human cancer (practical approach)				X		X	
26	**C-81**	Methods in protein analysis			X				
27	**C-64**	methods Immunology 111				X		X	
28	**C-75**	Methods in molecular parasitology			X				

No.	Course No.	Course title	Professional and Practical Skills						
			a	b	c	d	e	f	g
29	**B5-32**	Monoclonal antibodies		X				X	
PhD dissertation			X	X	X	X	X	X	X

No.	Course No.	Course title	General and Transferable Skills						
			a	b	c	d	e	f	g
1		German language							X
2		Research and research methodology					X		
3	A-24	Biotechnology II						X	
4	A-81	Computer II			X				
5	B1-2	Advanced molecular genetic				X			
6	B1- 94	Special topics		X					
7	B1- 95	Seminars	X						
8	A-50	Immunogenetics				X			
9	B1-1	Advanced general and molecular virology						X	
10	B1-4	Aging (molecular approach)		X					
11	B1-19	Gene regulation in eukaryotes							X
12	B1-20	Genetic control of insects					X		
13	B1-30	Medical biotechnology				X			
14	B1-37	Molecular biology of insects and insect viruses	X						
15	B1-47	Molecular evaluation				X			
16	B1-53	Molecular human pathology		X					
17	B1-61	Molecular structure of human chromosomes							X
18	B1-62	Molecular taxonomy	X						
19	B1-64	Mutagenesis and carcinogenesis			X				
20	B1-71	Physiological and biochemical host pathogen relationship		X					
21	B1-73	Plant genetic transformation				X			
22	B1-76	Plasmid, recombinant DNA and genetic engineering						X	
23	B1-86	Techniques for the analysis of complex genomes					X		
24	C-27	Experimental biochemistry							X
25	C-43	Human cancer (practical approach)						X	
26	C-81	Methods in protein analysis	X						
27	C-64	methods Immunology 111		X					
28	C-75	Methods in molecular parasitology				X			

No.	Course No.	Course title	General and Transferable Skills						
			a	b	c	d	e	f	g
29	B5-32	Monoclonal antibodies			X				
PhD dissertation			X	X	X	X	X	X	X

Program Coordinator: **Prof. Dr. Adel Guirguis**

Head of Department: Prof. Dr. Ibrahim Helmy

Matrix Between Program ARS and Program ILO's

Matrix between Program ARS and Program ILO's

2/1 (Knowledge & Understanding)

Program Academic Standard	Program ILO's (Knowledge & Understanding)								
	2/1a	2/1b	2/1c	2/1d	2/1e	2/1f	2/1g	2/1h	2/1i
3.1.1	X								
3.1.2		X							
3.1.3			X						
3.1.4				X		X		X	
3.1.5					X		X		X

2/2 Intellectual Skills

Program Academic Standard	Program ILO's (Intellectual Skills)								
	2/2a	2/2b	2/2 c	2/2 d	2/2 e	2/2f	2/2g	2/2 h	2/2i
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		
3.2.8								X	
3.2.9									X

2/3 (Practical and Professional Skills)

Program Academic Standard	Program ILO's (Practical and professional Skills)						
	2/3/a	2/3/b	2/3/c	2/3/d	2/3/e	2/3/f	2/3/g
3.3.1	X						
3.3.2		X					
3.3.3			X	X			
3.3.4					X		
3.3.5						X	X

2/4 (General and Transferable skills)

Program Academic Standard	Program ILO's (General and Transferable skills)						
	2/4/a	2/4/b	2/4/c	2/4/d	2/4/e	2/4f	2/4/g
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

Program Coordinator: **Prof. Dr. Adel Guirguis**

Head of Department: Prof. Dr. Ibrahim Helmy

Courses specification

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-2**	**Course Title:**	Advanced Molecular Genetics				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- definition an appreciation, at an advanced level, of the mechanisms that control gene expression, the genetic determination of developmental pathways, from genotype to phenotype. 2/2-Clarifying difference the principles and concepts of advanced molecular genetics between extracellular signaling and advanced molecular genetics. **2/3-** Understanding of concepts in the areas of gene regulation, developmental genetics and human genetics 2/4- Explaining the attitudes and ethical basis in scientific research and in advanced molecular genetics. 2/5- Evaluating professional decision genes function and their roles in development

3. Intended Learning Outcomes of Course (ILO's)	
a. Knowledge and Understanding:	a/1- Explain the mutual links between chemistry & structure of biological macromolecules and the relationship between structure and function in advanced molecular genetics. Summarize the basics and ethics of scientific 2-/ a researches of advanced molecular genetics fields of basic properties of genes and genomes and extending to the complex, hierarchical interactions fundamental to living organisms a/3 - Express the recent theories, methodologies, tools and ethics of scientific research advanced molecular genetics field. a/4- Remodel the actual quality standards of the practical analysis and determination of central dogma (transcription and translation).
b. Intellectual skills:	1- Evaluate professional decision taking for genetic /b

	engineering application of advanced molecular genetics. 2- Innovate the suitable methods for different advanced /b genetics with the cell signaling. 3- Distinguish between the different aspects of gene /b regulation during cell growth and differentiation. 4- Design and determine the information in the field of /b biotechnology to benefit from it in taking conclusion. b/5- Detramien recent specific of response to a changing environment, as well as developments that are more related to commercial and molecular genetics applications.
c. Practical and Professional Skills of course:	1-Extract relevant information from literature databases /c and to present it in written form advanced molecular biology. c/2- Diagnose an individual research project that will normally include laboratory experiments of advanced molecular genetics. c/3 - Comprehension of scientific research data described in peer-reviewed journals c/4 - Prepare modern modules of reports in advanced molecular genetics research analysis for simplifying assessment by using English terminologies.
d. General and Transferable Skills	1- Work on team for using all methods with public, /d collegeous and appropriate authorities. d/2- Show management skills for using information technology to improve his professional practice in internet and relative information. d/3- Treat by efficiency with computer's Practicing to determine his learning needs. d/4- Use different sources of information to obtain data for a given advanced molecular genetics course topics. d/5- Communicate with others & Manage time effectively. d/6- Show self learning abilities in situation comparable to his level. d/7- Use audio & video means for Displaying information to learn independently and seek continuous learning in advanced molecular genetics.

	4. Course Contents:
No.	**Topic**
1	Advanced structure of nucleic acid
2	basic properties of genes and genomes
3	Regulation of gene expression
4	replication & Transcription & translation
5	Regulation signal transduction
6	Applied molecular genetics of advanced biotechnology
7	Gene expression in immune 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:	
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-** Asthagiri A, Lauffenburger D. Bioengineering Models of Cell Signaling. Annual Review of Biomedical Engineering. 2:31-53, 2000.
c. Suggested Books	1- Molecular Cell Biology, 5th edition. Lodish, Berk, Matsudaira, Kaiser, Krieger, Scott, Zipursky, and Darnell. W.H. Freeman & Co., 2011. 2- Genes VIIII. Lewin. Prentice Hall, 2011
1-Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal

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

Matrix of Knowledge, Skills ILOs for Advanced Molecular 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
Advanced structure of nucleic acid	**1&2**	**a/1, a/2**	**b/1, b/4**	**c/1, c/4**	**d/1, d/4, d/6**
basic properties of genes and genomes	**3&4**	**a/1, a/3**	**b/1, b/5**	**c/1, c/2**	**d/2, d/4**
Regulation of gene expression	**5&6**	**a/1, a/2**	**b/1, b/3**	**c/2, c/3**	**d/1, d/3, d/5**
replication & Transcription & translation	**7&8**	**a/1, a/3, a/4**	**b/2, b/5**	**c/2, c/5**	**d/3, d/6**
Regulation signal transduction	**9&10**	**a/2, a/3**	**b/1, b/2**	**c/1, c/5**	**d/1, d/3, d/6**
Applied molecular genetics of advanced biotechnology	**11&12**	**a/2, a/4**	**b/2, b/3**	**c/2, c/4**	**d/1, d/4, d/7**
Gene expression in immune system	**13&14**	**a/2, a/4**	**b/2, b/4**	**c/3, c/5**	**d/5, d/4, d/7**

Course coordinator: Prof. Dr. Amal Abd El-Aziz
Head of Department: Prof. Dr. Ibrahiem Halmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-76**	**Course Title:**	**Plasmid, recombinant DNA and genetic engineering**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	At the end of this course the student will be able to: 2/1- Write papers in molecular biology and using data show devices, publishing journals and scientific conferences in Plasmid, recombinant DNA and genetic engineering. 2/2- Clarify difference the principles and concepts of plasmid, recombinant DNA and genetic engineering. 2/3- Evaluate and determine the information in the field of interest in the human diseases therapy and genetic engineering in medicine. 2/4- Explain the attitudes and ethical basis in scientific research and in construct DNA and genetic engineering. 2/5- Evaluate professional decision taking for genetic engineering application of medicine.

3. Intended Learning Outcomes of Course (ILO's)	
e. Knowledge and Understanding:	a/1- Clarify the different principles and concepts of genetic engineering and molecular biology Explain basics and ethics of scientific researches of genetic 2-/ a engineering fields of basic properties a/3 - Express the recent theories, methodologies, tools and ethics of scientific research in cloned gene that can be construct DNA. a/4- Be acquainted with quality standards of the practical analysis and determination of cloned genes to create genes with new properties.
f. Intellectual skills:	1- Evaluate professional decision taking for genetic engineering /b application. 2- Innovate the suitable methods for different advanced /b Transgenic Technologies

	3- Distinguish between the different aspects of homologues /b and Library Screening. 4- Determine the information in the field of biotechnology to /b benefit from it in taking conclusion. b/5- Determine recent specific techniques in analyzing DNA, DNA sequencing and genomics analyzing.
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 in studying plasmid, recombinant DNA and genetic engineering. 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	Classified of Manipulative enzymes of purified DNA
2	Plasmids vectors for bacteria
3	Types vectors for Eukaryotes
4	Construct of DNA
5	Analyzing cloned DNA and DNA sequencing.
6	Transgenic Technologies, characters of Shuttle Vectors and Library Screening -
7	Applications of recombinant DNA techniques in medicine

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	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
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)	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	3- Molecular cloning, 5^{th} edition. Brown Co., 2010. 4- Genes VIIII. Lewin. Prentice Hall, 2011
5- Periodicals, Web Sites, … etc ...	a- Periodicals, Web sites, … etc …www.prenhall.com/lewin. b- www.prancipal genetics.

Course coordinator: Prof. Dr. Adal Guirgius
Dr. Nasser Hussein abbes
Head of the department council: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Plasmid, recombinant DNA and genetic engineering Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Classified of Manipulative enzymes of purified DNA	**1&2**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/4**
Plasmids vectors for bacteria	**3&4**	**a/1, a/3**	**b/1**	**N/A**	**d/2, d/4**
Types vectors for Eukaryotes	**5&6**	**a/1, a/3**	**b/1, b/2**	**N/A**	**d/1, d/3, d/5**
Construct of DNA	**7&8**	**a/1, a/3**	**b/2, b/3**	**N/A**	**d/3, d/6**
Analyzing DNA and cloning DNA sequencing, Genomics Analyzing	**9&10**	**a/2, a/4**	**b/2, b/3, b/5**	**N/A**	**d/1, d/2, d/6**
Transgenic Technologies charcuteriez Shuttle Vercors Homologues and Library Screening - Selection of specific recombinant clones	**11&12**	**a/2, a/4**	**b/1, b/2, b/3, b/5**	**N/A**	**d/1, d/3, d/7**
Applications of recombinant DNA techniques in medicine	**13&14**	**a/2, a/4**	**b/1, b/4, b/5**	**N/A**	**d/1, d/4, d/7**

Course coordinator: Prof. Dr. Adal Guirguis
Dr. Nasser Hussein Abbas
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	A-50	**Course Title:**	Immunogenetics				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Developing depth knowledge of the immune system with emphasis on Immunogenetics and clinical immunology. 2/2-Clarifying knowledge of the fundamental immune processes needed for further study in this field while concentrating on the considerable inter-dependent co-ordination of immunological mechanisms that occurs during the development of an immune reaction. 2/3- Evaluating and determining of the immunological mechanisms responsible for the immunpgenetics observed in animal models and humans in relation to autoimmune disease. 2/4- Explaining how the immune system recognizes and deals with different kinds of infectious agents and oncogenic challenge. 2/5- Expressing and differentiate between the genetic basis of immunological processes and diseases.

3. Intended Learning Outcomes of Course (ILO's)	
i. Knowledge and Understanding:	1- Explain the mutual cytokines gene polymorphism and /a its bioinformatics involved in immune responses. Divide the basics and ethics of scientific researches of 2-/a Immunogenetics field of basic properties of genes and genomes. a/3 - Express the recent theories, methodologies, tools and ethics of scientific research the role of Immunogenetics a/4- Remolding an understanding of the genes of the major histocompatibility complex, T cell receptor and immunoglobulin receptor.
j. Intellectual skills:	b/1- Evaluate professional decision taking for genetic engineering application of Immunogenetics b/2- Interpret different information to solve the problems of develop the performance in the applications of

	immunological diseases. b/3- Distinguish between the different aspects of primary immunodeficiency b/4- Evaluate and determine the information in the field autoimmune disease and its relationship to human disease. b/5- Determine Immunogenetics application in different infectious diseases
k. Practical and Professional Skills of course:	**Not Applicable**
l. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying Immunogenetics. 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 to bioinformatics**
2	**cytokine gene polymorphism and biostatics of polymorphism**
3	**Primary immunodeficiency diseases**
4	**Immunogenetics of cancer**
5	**Immunogenetics of viral infection**
6	**Systems Immunogenetics of vaccines**
7	**and ImmunogeneticsHLA**

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	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
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)	- Immunogenetics of Insulin Dependent Diabetes - Immunogenetics of Autoimmune Disease (Medical Intelligence Unit) - Immunogenetics: Its Application to Clinical Medicine . Oral Immunogenetics and Tissue Transplantation: International Symposium Proceedings (Developments in immunology)**.**
11. Suggested Books	- Basic Immunology Updated Edition: Functions and Disorders of the Immune System With STUDENT CONSULT Online Access, 3e (Basic Immunology: Functions and Disorders of the Immune System).
12. Periodicals, Web Sites, … etc ...	-http:// http://www.amazon.com/Basic-Immunology-Updated-Functions-Disorders/dp/141605569X/ref=sr_1_sc_3?s=books&ie=UTF8&qid=1329649504&sr=1-3-spell http://www.ls.manchester.ac.uk/masterscourses/courses/immunologyandimmunogenetics/courseprofile/course/?code=02224 http://www.ncbi.nlm.nih.gov/pubmed/

Course coordinator: Prof. Dr. Samir Elmasry
Ass.Prof. Roba Talaat
Dr. Sherif Mohsen Elsherbini
Dr. Yasser \Bastawy
Head of the department council: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Immunogenetics 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 bioinformatics	1&2	a/1, a/2	b/1, b/4	N/A	d/1, d/4,d/6
cytokine gene polymorphism and biostatics of polymorphism	3&4	a/1, a/3	b/1, b/5	N/A	d/2, d/4
Primary immunodeficiency diseases	5&6	a/1, a/2	b/1, b/3	N/A	d/1, d/3, d/5
Immunogenetics of cancer	7&8	a/1, a/3, a/4	b/2, b/5	N/A	d/3, d/6
Immunogenetics of viral infection	9&10	a/2, a/3	b/1, b/2	N/A	d/1, d/3, d/6
Systems Immunogenetics of vaccines	11&12	a/2, a/4	b/2, b/3	N/A	d/1, d/4, d/7
and HLA Immunogenetics	13&14	a/2, a/4	b/2, b/4	N/A	d/5, d/4, d/7

Course coordinator: Prof. Dr. Samir Elmasry
Ass.Prof. Roba Talaat
Dr. Sherif Mohsen Elsherbini
Dr. Mohmed Yoness
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-1	**Course Title:**	Advanced and general molecular virology				
No. units	3	**Lecturers**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Simplifying research points to set them into educational curricula in molecular biology department (advanced and general molecular virology). 2/2- Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of (advanced and general molecular virology). 2/3- Recognizing the principles and concepts of the different methods used to study in structure between different types and strain, and importantly, the host viral interaction. 2/4- Evaluating and determine the information in the field of advanced biotechnology utilized in fighting against viral infection.

3. Intended Learning Outcomes of Course (ILO's)	
m. Knowledge and Understanding:	a/1- Explain the mutual links between chemistry & structure of biological macromolecules and the relationship between structure and function in gene regulation system. a/2- Illustrate different concepts of viral structure and viral-host interaction. Summarize the functions and contributions of cell a/3- signaling against different viral replication. 4- Describe the viral-host interaction and viral replication. /a 5- Express the recent theories, methodologies, tools and /a ethics of scientific research the mechanisms of viral to cell interaction and cellular signal transduction.
n. Intellectual skills:	b/1 – Interpret Results of different methods of molecular immunology. b/2- Suggest the recent and sensitive assays required to measure the viral progeny and replication in addition to cellular immune response and signal transduction

	related viral infection. 3- Evaluate evidences in the critical role of viral structure /b on infection and therapy. 4- Determine problems of the correlation between the /b cell receptors and viral entry.
o. Practical and Professional Skills of course:	Not Applicable (N/A)
p. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying advanced and general molecular virology. 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	Viral structure and classification
2	DNA viruses
3	RNA viruses
4	Viral host interaction
5	Molecular diagnosis of viral infection
6	Linkage between viral infection and other diseases
7	Viral 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:	
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%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	Diagnostic Medical Virology, 2006, 5^{th} edn.,
11. Suggested Books	Host-Pathogen Interactions prtocols and methods by Steffen Rupp and Kai Sohn (2011)
12. Periodicals, Web Sites, … etc ...	www.prenhall.com/lewin. genetics.www.prancipal http://www.cellbio.com/protocols.html

Course Name	Advanced and general molecular virology
Course Code	B1-1

Course coordinator: Ass. Prof. Dr. Omayma Khamiss
Dr. Amal Hassan
Dr. Hany Kaliel
Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Advanced and general molecular virology Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Viral structure and classification	**1&2**	**a/1**	**b/1**	**N/A**	**d/1**
DNA viruses	**3&4**	**a/2**	**b/1**	**N/A**	**d/1, d/4**
RNA viruses	**5&6**	**a/2**	**b/1**	**N/A**	**d/2, d/5**
Viral host interaction	**7&8**	**a/3**	**b/2**	**N/A**	**d/2, d/6**
Molecular diagnosis of viral infection	**9&10**	**a/4**	**b/3**	**N/A**	**d/3, d/6**
Linkage between viral infection and other diseases	**11&12**	**a/4, a/5**	**b/4**	**N/A**	**d/3, d/7**
Viral therapy	**13&14**	**a/4, a/5**	**b/4**	**N/A**	**d/4, d/7**

Course coordinator: Ass. Prof. Dr. Omayma Khamiss
Dr. Amal Hassan
Dr. Hany Kaliel
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-4	**Course Title:**	Aging (molecular approach)				
No. units	3	**Lect.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Writing papers in molecular biology & using display devices, publishing tool & scientific conferences. 2/2- Explaining the theories suggest that ageing results from the accumulation of damage to DNA in the cell 2/3- Clarify difference the principles and concepts the DNA is formative basis of cell structure and function, damage to the DNA molecule, or genes, can lead to its loss of integrity and early cell death 2/4- Evaluating and determine the information in the field of Accumulative-Waste Theory, Wear-and-Tear Theory, Somatic Mutation Theory in ageing of human. **2/5** Communicating with global magazines for paper publishing.

3. Intended Learning Outcomes of Course (ILO's)	
q. Knowledge and Understanding:	a/1- Express the recent theories, methodologies, tools and ethics of scientific research molecular biology field in aging. a/2- Divide genetic loci in human of potential relative to the pathobiology of aging. a/3- Summarize comparative gerontology approach. a/4- The existence of gerontology. a/5- Explain major gerontogene mutants a/6- Summarize and discuss the main disease categories that may affect the body as well as the basic mechanisms underlying these disorders (etiology, pathogenesis and natural history). a/7- Determine the fate and complications of each particular disease and outline the general management procedures.

r. Intellectual skills:	b/1- Memorize technical terms used in scientific researches in aging. b/2- Distinguish laboratory diagnosis. b/3- Design molecular reports in aging. b/4- Evaluate according to evidence the causal relationship of different types of related diseases b/5- Determine the sign and symptoms of diseases based on the underlying changes responsible for symptomatology and physical changes in the patients, thereby enabling the candidate recognize patients with threatening conditions.
s. Practical and Professional Skills of course:	Not Applicable (N/A)
t. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying the science of aging. 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	Gerotogenes in the evanescence
2	Define and use the terminology related to aging
3	Cross-Linkage Theory
4	Free-Radical Theory
5	Reliability theory of ageing and longevity
6	Mitohormesis
7	Disrepair-Accumulation Theory

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	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

Course coordinator: Prof. Dr. Khalil Halfawy
Dr Usama F Shaalan
Head of the department council: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Aging (molecular approach) Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Gerotogenes in the evanescence	**1&2**	**a/1**	**b/1**	**N/A**	**d/1, d/2**
Define and use the terminology related to aging	**3&4**	**a/2, a/4**	**b/1, b/2**	**N/A**	**d/1, d/4**
Cross-Linkage Theory	**5&6**	**a/2**	**b/1**	**N/A**	**d/2, d/7**
Free-Radical Theory	**7&8**	**a/3, a/5**	**b/2**	**N/A**	**d/2, d/5**
Reliability theory of ageing and longevity	**9&10**	**a/4, a/6**	**b/3, b/5**	**N/A**	**d/3, d/6**
Mitohormesis	**11&12**	**a/4, a/7**	**b/4, b/6**	**N/A**	**d/3, d/6**
Misrepair-Accumulation Theory	**13&14**	**a/4**	**b/4**	**N/A**	**d/4, d/5**

Course coordinator: Prof. Dr. Khalil Halfawy
Dr Usama F Shaalan
Head of the department council: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

13. Course information:							
Course Code:	**B1-19**	**Course Title:**	**Gene Regulation in Eukaryotes**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Doctorate
Department	**Molecular Biology**						

14. Course Aims	
	2/1- This course will provide students with a basic understanding of gene regulation mechanisms. 2/2- Summarizing Genome organization: From nucleotides to chromatin and telomeres function. 2/3- Differences between prokaryotic and eukaryotic regulation include transcription factors, DNA controlling elements, RNA editing and connections between gene expression steps. 2/4- Identifying the cells of the body develop from a single fertilized egg cell via genetic regulatory mechanisms

15. Intended Learning Outcomes of Course (ILO's)	
u. Knowledge and Understanding:	a/1- analysis gene structural elements as well chromatin structure. a/2- understanding the pattern of DNA and histone modifications that facilitate transcription regulation a/3- Recall he functional domains of transcription factors and different transcription factors families. a/4- demonstrate the concept of epigenetics and the connection between post transcription and post translation gene regulatory events
v. Intellectual skills:	1- Memorize technical terms used in scientific researches /b of gene regulation in eukaryotic. 2- Distinguish between the different Trans control of /b transcription & Cis-acting sequences in transcriptional regulation. 3- Evaluate and analysis the relation between core /b promoter sequence and determine function and expression gene pattern. b/4- Analysis of differential gene expression pattern and

	find connection with development, adaptation and disease.
w. Professional Skills of course:	c/1- Mastery of reading and interpreting scientific literature in gene regulation fields. c/2- Enhancement of oral and written communication skills. c/3- Development of critical thinking and creativity in scientific research from epigenetic.
x. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying gene regulation in eukaryotic. 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.

	16. Course Contents:
Week No.	**Topic**
1&2	Introduction and perspective.
3&4	Genome organization: From nucleotides to chromatin and chromatin modification.
5&6	Core promoter and promoter-proximal and terminal elements.
7&8	Transcription factors families and their characteristic domains.
9&10	RNA processing, editing and degradation.
11&12	Epigenetic and connection between post transcription and translation modification.
13&14	Cancer and oncogenes.

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

20. List of References:	
21. Notes	
22. Essential Books (Text Books)	- Genes XI 11^{th} ed., by Lewin 2014. - 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)
23. 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 coordinator: Prof. Dr. Adal Guirguis
Dr. Nasser Hussein Abbas
Head of Department: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Gene Regulation Course B1-19

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/1**	**b/1**	**c/1**	**d/1&d/2**
Genome organization: From nucleotides to chromatin and chromatin modification.	**3&4**	**a/1&a/2**	**b/1**	**c/1**	**d/1&d/2**
Core promoter and promoter-proximal and terminal elements.	**5&6**	**a/3**	**b/2**	**c/1&c/2**	**d/1,d/5,d/4**
Transcription factors families and their characteristic domains.	**7&8**	**a/3**	**b/3**	**c/2,c/3**	**d/1,d/2**
RNA processing, editing and degradation.	**9&10**	**a/4**	**b/4**	**c/2&c/3**	**d/2,d/3**
Epigenetic and connection between post transcription and translation modification.	**11&12**	**a/4**	**b/4**	**C/1&c/3**	**d/2,d/3&d/4**
Cancer and oncogenes.	**13&14**	**a/2,a/3&a/4**	**b/4**	**C/1&c/3**	**d/2,d/3&d/4**

Course coordinator: Prof. Dr. Adal Guirguis
Dr. Nasser Hussein Abbas
Head of Department: Prof. Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-20**	**Course Title:**	**Genetic control of insects**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects and critical approach to knowledge in the field Genetic control of insects. 2/2- Clarifying different principles and concepts of eukaryotes can respond to their environment. 2/3- Evaluating the information in the field of interest in plants need to regulate their plant resistance to insects specialization. 2/4- Explaining the attitudes and ethical basis in scientific research and in genetic engineering consist of hundreds of different Bio-control Agents for Insects. 2/5- Summarizing the professional decision taking in different specialize negative environmental impact from release of gaps.

3. Intended Learning Outcomes of Course (ILO's)	
y. Knowledge and Understanding:	a/1- Explain basics and ethics of scientific researches of molecular biology fields in genetic control of insects. Suggest the basics and ethics of scientific researches of the 2-/ a mechanisms of action of some toxic agents like pesticides and insecticides and their effects on the genetic alterations of different species. a/3 - Express the recent theories, methodologies, tools and ethics of scientific research the relationship between host and resistive pathogen. a/4- Remolding the actual quality standards of the practical analysis and determination relationship hostess and insects.
z. Intellectual skills:	1- Design and determine the information in the field of the /b relationship between pathogen and their host to benefit from it in taking conclusion b/2- Suggest Paraphrase English technical terms used in scientific

	researches of genetic control of insects. 3- Innovate the suitable methods for different of specific /b proteins and enzymes in the infect pathogen of plants. 4- Distinguish the molecular characterization of different /b organisms and how to control their genes expression.
aa. Practical and Professional Skills of course:	1- Select of theoretical negative environmental impact from /c release of geps in genetic control of insects. 2- calculate the data different modern laboratory techniques for /c identification of different research analysis in biocontrol agents for insects. c/3 – Write the modern modules of reports in genetic engineering of Bio control agents for insects research analysis for simplifying assessment by using English terminologies.
bb. General and Transferable Skills	1- Use internet and relative information technologies to improve /d his/her professional practice in studying genetic control of insects. 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 & plant resistance to insects
2	genetic engineering of plants for insect resistance
3	Beneficial Insects for Pest Management Programs
4	evaluation of theoretical negative environmental impact from release of gaps
5	Genetic Engineering of Biocontrol Agents for Insects
6	Genetic Control of Embryonic Development in Insects
7	Germline Transformants Spreading Out to Many Insect Species

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)	-Marjorie A. Hoy (2003) Insect Molecular Genetics(Second Ed.) - Jack E. Rechcigl and Nancy A. Rechcigl.(1999) Biological And Biotechnological Control of Insect Pests -De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. -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 ...	…www.prenhall.com/lewin. genetics.www.prancipal http://www.cellbio.com/protocols.html

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gehan Mohamed Ahmed Ibrahim

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

Matrix of Knowledge, Skills ILOs for Genetic control of insects 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 & plant resistance to insects	**1&2**	a/3,a/4	b/3	c/2,c/3	d/2, d/4
genetic engineering of plants for insect resistance	**3&4**	a/1		c/1,c/2	d/1, d/3,
Beneficial Insects for Pes Management Programs	**5&6**	a/1,a/2	b/1,b/3	c/1,c/3	d/1, d/5
evaluation of theoretical negative environmental impact from release of geps	**7&8**	a/2	b/1	c/1,c/2	d/3, d/6
Genetic Engineering of Biocontrol Agents for Insects	**9&10**	a/4	b/1,b/2	c/2	d/1, d/4
Genetic Control of Embryonic Development in Insects	**11&12**	a/1	b/1,b/4	c/1, c/3	d/1, d/4, d/6
Germline Transformants Spreading Out to Many Insect Species	**13&14**	a/1	b/4	c/3	d/1, d/4

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gehan Mohamed Ahmed Ibrahim
Head of Department: Prof.Dr. Ibrahim Helmy

Department: Molecular Biology

Course Specifications

1. Course information:							
Course Code:	**B1-30**	**Course Title:**	**Medical Biotechnology**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Ph.D
Department	**Molecular Biology**						

2.Course Aims	
	2/1- Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology (medical biotechnology). 2/2- Recognize different basis of biotechnology and its applications in medicine. 2/3- Dividing between the areas of cellular and molecular biology, protein biochemistry and immunology necessary for professional practice in the field of medical biotechnology. 2/4- Summarizing application of relevant analytical techniques within the field of medical biotechnology. 2/5- Evaluating communication skills necessary to successfully conduct research and development in medical biotechnology.

2. Intended Learning Outcomes of Course (ILO's)	
cc. Knowledge and Understanding:	a/1- Clarify difference the principles and concepts of genetics, genetic engineering and molecular biology. a/2 –Divide the relationship between cellular and molecular biology and immunology necessary the field of medical biotechnology. a/3- Explain the cellular processes and relationship to medical biotechnology. a/4- Express the pharmacology, toxicology and clinical trials.
dd. Intellectual skills:	b/1- Design different information to solve the problems of immune response and chemotherapy. b/2- Distinguish between the different aspects of molecular pathology and medical biotechnology. b/3- Find solution to the risks imposed during the treatment and analysis of molecular diagnostic diseases by of medical biotechnology.

	b/ 4- Analyze the results of medical biotechnology assays and solving problems. b/5- Evaluate ethical and social responsibilities with relationship to medical biotechnology research.
ee. Practical and Professional Skills of course:	**Not Applicable (N/A)**
ff. General and Transferable Skills	d/1- Use internet and relative information technologies to improve his/her professional practice in studying medical 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 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.

	3. Course Contents:
No.	**Topics**
1	Techniques and Processes in Biotechnology Research
2	Immunotechnology, Microbiology and Cellular Therapy
3	Pharmacology, Toxicology and Clinical Trials
4	Principles and Techniques in DNA, Protein Biochemistry & Molecular Biology
5	Principles and Techniques in Immunology
6	Ethics & statistics in Medical Biotechnology Research
7	Statistics for Biotechnology Research

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

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

6. 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%

7. **List of References:**	
a. Notes	
b. Essential Books (Text Books)	-Medical Equipment Management (Series in Medical Physics and Biomedical Engineering). Keith Willson, Keith Ison, Slavik Tabakov, USA.(2012). -Deutsch A (Ed.)(2003). Function and regulation of cellular systems: Experiments and models (Mathematics and Biosciences in interaction). Birkhauser (Architectural), ISBN 3764369256. -James A. Birchler (2010). Plant Chromosome Engineering: Methods and Protocols (Methods in Molecular Biology). Publisher, Humana Press ISBN-13: 978-1617379567
c. Suggested Books	-Molecular Biology of the Cell, 4^{th} edition. Alberts, Johnson, Lewis, Raff, Roberts and Walter. Garland Pub. Co., 2010. -Basic Biotechnology, Colin Ratledge, and Bjorn Kristiansen, 2011. -Genes VIIII. Lewin. Prentice Hall, 2011
1. Periodicals, Web Sites, … etc ..	www.prenhall.com/lewin. www.prancipal genetics.

Course coordinator: Prof. Dr. Ibrahim Helmy
Dr. Hany Kalil
Dr. Weal Saad
Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Medical 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
Techniques and Processes in Biotechnology Research	**1&2**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/2, d/4**
Immunotechnology, Microbiology and Cellular Therapy	**3&4**	**a/2, a/4**	**b/2, b/3**	**N/A**	**d/1, d/3**
Pharmacology, Toxicology and Clinical Trials	**5&6**	**a/3, a/4**	**b/2, b/4**	**N/A**	**d/1, d/4**
Principles and Techniques in DNA, Protein Biochemistry & Molecular Biology	**7&8**	**a/1, a/3**	**b/4**	**N/A**	**d/1, d/3, d/4**
Principles and Techniques in Immunology	**9&10**	**a/1, a/3, a/4**	**b/1, b/4**	**N/A**	**d/1, d/5, d/6**
Ethics & statistics in Medical Biotechnology Research	**11&12**	**a/5, a/4**	**b/4, b/5**	**N/A**	**d/1, d/4, d/5**
Statistics for Biotechnology Research	**13&14**	**a/1, a/3**	**b/5**	**N/A**	**d/1, d/5, d/6**

Course coordinator: Prof. Dr. Ibrahim Helmy
Dr. Hany Kalil
Dr. Weal Saad
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-37**	**Course Title:**	**Molecular biology of insect and insects viruses**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Identifying recent theories, and ethics of scientific research in molecular biology of insect and insects viruses. 2/2- Clarifying differences in the principles and concepts of insects and insect viruses and how they can respond to environment. 2/3- Evaluating and determine the information in the field of molecular biology of insects and insect viruses biotechnology. 2/4- Explaining the attitudes and ethical basis in scientific research and in the relationship between host and their host pathogen. 2/5- Showing awareness to community and by researching of its agriculture's problems.

3. Intended Learning Outcomes of Course (ILO's)	
gg. Knowledge and Understanding:	a/1- Remolding the actual quality standards of the practical analysis and determination of molecular biology of insect and insects viruses. Explain basics and ethics of scientific researches of 2-/ a the mode of action of some toxic agents like pesticides and insecticides and their effects on the genetic alterations of different species. a/3 - Express the recent scientific research the relationship between different pathways and signaling in defense mechanism against biotic and abiotic challenge. a/4- Plan molecular investigations to achieve a definitive diagnosis of insects viruses diseases.
hh. Intellectual skills:	b/1- Find solution to the risks imposed during the treatment and analysis of molecular diagnostic insects viruses diseases. b/2- Distinguish between the different aspects of molecular characters and classification of insects and infected viruses.

	3- Innovate the suitable methods for different of specific /b relationship between host and host pathogen. 4- Design different information to solve the problems use /b of beneficial insects and products as a source of diseases recovery. 5- Evaluate and determine the information in the field of /b the relationship between the pollution and some diseases to benefit from it in taking conclusion.
ii. Practical and Professional Skills of course:	1- Select analytical methods for analysis of molecular /c biology in insect and insects viruses. 2- Compare between different types of methods and tools /c used in testing of some molecular parameters and in diagnosis of diseases. c/3- Prepare modern modules of reports in genetic engineering of Bio control agents for insects research analysis for simplifying assessment by using English terminologies.
jj. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying molecular biology of insect and insects viruses. 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	Nuclear and Extra nuclear DNA in Insects & Genetic Systems, Genome Evolution in Insects
2	Sex Determination in Insects & Molecular Genetics of Insect Behavior
3	Molecular Genetics of Insect Behavior & Insect Population Ecology and Molecular Genetics
4	Transgenic Pest and Beneficial Insects for Pest Management Programs
5	Classification of insect viruses & Insect parasites and polydnaviruses
6	Gene structure of baculovirus and construction of expression vectors
7	Insect toxins: gene structure and use for insect control using the baculovirus vector

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 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 -De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103. -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

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gehan Mohamed Ahmed Ibrahim

Head of the Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular biology of insect and insects' viruses Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Nuclear and Extra nuclear DNA in Insects & Genetic Systems, Genome Evolution in Insects	**1&2**	a/2, a/4	b/3	c/2	d/1, d/6
Sex Determination in Insects & Molecular Genetics of Insect Behavior	**3&4**	a/2	b/1, b/2	c/1	d/2, d/4
Molecular Genetics of Insect Behavior & Insect Population Ecology and Molecular Genetics	**5&6**	a/2	b/3, b/1	c/1	d/1, d/3,
Transgenic Pest and Beneficial Insects for Pest Management Programs	**7&8**	a/1, a/4	b/1, b/4	c/2,c/3	d/3, d/6
Classification of insect viruses & Insect parasites and polydnaviruses	**9&10**	a/3	b/5	c/3	d/1, d/5, d/6
Gene structure of baculovirus and construction of expression vectors	**11&12**	a/3	b/3	c/2,c/3	d/1, d/4
Insect toxins: gene structure and use for insect control using the baculovirus vector	**13&14**	a/1, a/4	b/1	c/1	d/1, d/4

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Gehan Mohamed Ahmed Ibrahim
Head of Department: Prof.Dr. Ibrahim Helmy
Department: Molecular Biology

Course Specifications

1. Course information:							
Course Code:	**B1-47**	**Course Title:**	Molecular evaluation				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects , collecting and developing information molecular evaluation. 2/2-Clarifying difference the principles and concepts of advanced the evolution and organization of the eukaryote genome. **2/3-** Evaluating and determine the evolution of DNA and gene products, the application of genetic data in evolutionary and ecological studies of various organisms, 2/4- Explaining the attitudes and a theoretical introduction to the main processes creating genetic variation as well as processes of evolutionary change (genetic drift and selection). 2/5- Summarizing professional decision taking for evolutionary history based on genotype and DNA-sequence data.

3. Intended Learning Outcomes of Course (ILO's)	
kk. Knowledge and Understanding:	a/1- Explain basics and ethics of scientific researches of molecular biology fields in molecular evaluation. Clarify difference of genetic variation and processes 2-/ a of evolutionary change (genetic drift and selection). a/3 - Express the recent theories, methodologies, tools and ethics of scientific research the evolution and organization of the eukaryote genome. a/4- Remolding the actual quality standards of basic bioinformatics in molecular evaluation.
ll. Intellectual skills:	b/1- Suggest Paraphrase English technical terms used in scientific researches of molecular evaluation. 2- Innovate the suitable methods the application of genetic /b data in evolutionary. 3- Distinguish between the different aspects of the /b evolutionary history based on genotype and DNA-sequence data organization. 4- Evaluate and determine the information in the / b evolution of the Eukaryotic genome

	b/5- Determine recent specific of evolutionary bio-statistics (population genetics and phylogeny).
mm. Practical and Professional Skills of course:	1- Test the different analytical methods used in molecular /c evaluation. c/2- Test the basic bioinformatics (e.g. BLAST-search, primer-design and sequence alignment). c/3 Select different types of statistical tools used in molecular evaluation for obtaining research quality in molecular biology. 4- Prepare technological tools in the professional practice /c training in standard molecular genetics (e.g., sequencing and genotyping). 5- Write modern modules of reports evolutionary bio-/c statistics (population genetics and phylogeny).
nn. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying in molecular evaluation. 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	genetic data in evolutionary & ecological studies of various organisms
2	the evolution and organization of the eukaryote genome
3	theoretical introduction to the main processes creating genetic variation (e.g. mutations, recombination, gene conversion,
4	processes of evolutionary change (genetic drift and selection
5	introduction to important statistical tools for inference of current and past population processes and of evolutionary history based on genotype and DNA-sequence data (e.g. F-statistics, neutrality tests, coalescence statistics, and phylogenetic reconstruction)
6	evolution of the Eukaryotic genome
7	basic bioinformatics (e.g. BLAST-search, primer-design and sequence alignment), and evolutionary bio-statistics (population genetics and phylogeny).

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 - (15^{th}) 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)	5- Principles of Genetics by Robert H. Tamarin, Seventh Edition. Tata Mc-Graw Hill, India 2002 Edition. 6- A Celeste, S Petersen, P Romanienko, O Fernandez-Capetillo, HT Chen, O Sedelnikova, B Reina-San-Martin, V Coppola, E Meffre, MJ Difillippantonio, C Redon, D Pilch, A Olaru, M Eckhaus, RD Camerini-Otero, L Tessarollo, F Livak, K Maonova, WM Bonner, MC Nussenzweig, and A Nussenzweig (2002) Genomic Instability in Mice Lacking Histon H2AX. Science 296: 922-927. 7- Genetics : From Genomes by Hartwell L.H. & others Mc. Graw Hill
11. Suggested Books	• Genomes 3. Brown. John Wiley & Sons, 2010. 12. Genes VIIII. Lewin. Prentice Hall, 2011

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

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

Matrix of Knowledge, Skills ILOs for Molecular Evaluation Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
genetic data in evolutionary & ecological studies of various organisms	**1&2**	a/1,a/2	b/1,b/2	c1	d/1, d/3
the evolution and organization of the eukaryote genome	**3&4**	a/1,a/2	b/2	c/1,c/3	d/2, d/3
theoretical introduction to the main processes creating genetic variation (e.g. mutations, recombination, gene conversion,	**5&6**	a1,a3	b/1	c/2, c/4	d/2, d/5, d/6
processes of evolutionary change (genetic drift and selection	**7&8**	a/4	b/3, b/4	c/2, c/3	d/1
introduction to important statistical tools for inference of current and past population processes and of evolutionary history based on genotype and DNA-sequence data (e.g. F-statistics, neutrality tests, coalescence statistics, and phylogenetic reconstruction)	**9&10**	a/4	b/1, b/2, b/5	c/2,c/5	d/2, d/4
evolution of the Eucaryotic genome	**11&12**	a/1,a/2	b/1,b/2	c2, 3	d/3
basic bioinformatics (e.g. BLAST-search, primer-design and sequence alignment), and evolutionary bio-statistics (population genetics and phylogeny).	**13&14**	a/2, a/5	b/1,b/2	c/2	d/6

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

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-53**	**Course Title:**	**Molecular Human Pathology B1- 53**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Doctoral degree (Ph.D.)
Department	**Molecular Biology**						

2. Course Aims	
	2/1- The students, on completion of the course, will be able to know **Basis of Pathology Studies** and help students to understand from doing Microscope Slide to Read the detail of the slid Pathology with any Changes or diseases. 2/2- The detail of diseases theory, Causes and effects. 2/3- Comparing between Normal Tissues and Tissues with Pathological Changes. 2/4- Staining of different biochemical Proteins and Enzymes.

3. Intended Learning Outcomes of Course (ILO's)	
oo. Knowledge and Understanding:	a/1- Describe basic facts and theories of molecular Pathology. a/2- Summarize main basics & ethics of scientific researches of versatility of Diseases a/3- Express the principles and concepts of Reading Pathological Sections. a/4- Classify the relationship between Stages of diseases and the Microscopic Details of the Slides. a/5- Divide the mechanisms regulating diseases steps and the changes. a/6- Summarize the fundamental biochemical Determination of the Tissue Contents with different stains and diseases.
pp. Intellectual skills:	b/1- Compare between the different normal and abnormal Slide of the Tissue Sections. b/2- Analyze and interpret the Diseases histology. b/3- Compare the Normal Tissue with Tissues with different diseases.

qq. Professional Skills of course:	Not Applicable (N/A)
rr. 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 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 Pathology.

	4. Course Contents:
Week No.	**Topic**
1&2	Introduction and perspective.
3&4	Steps for Tissue Sectioning (From Scarifying, Preservatives Tell Microscope Slides)..
5&6	Cell Damage (Causes, Factors, Effects and Cautions).
7&8	Cell Inflammation (Acute and Chronic)..
9&10	Necrosis, Fibrosis and Cirrhosis.
11&12	Bilharisiasis, Amyloidosis , Granuloma and Different Pathological Phenomena.
13&14	Carcinomas types and Slide shape.

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} to10^{th}) - (6^{th}) Week - (14^{th}) Week

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

8. List of References:	a. *Harris TJ, McCormick F (2010). "The molecular pathology of cancer". Nat Rev Clin Oncol. **7** (5): 251–265. doi:10.1038/nrclinonc.2010.41. PMID 20351699.* b. *Cai, H; Caswell JL; Prescott JF (March 2014). "Nonculture Molecular Techniques for Diagnosis of Bacterial Disease in Animals: A Diagnostic Laboratory Perspective". Veterinary Pathology. **51** (2): 341–350. doi:10.1177/0300985813511132. PMID 24569613.* c. Ogino S, Stampfer M. Lifestyle factors and microsatellite instability in colorectal cancer: The evolving field of molecular pathological epidemiology. J Natl Cancer Inst 2010; 102: 365-7. d. Ogino S, Chan AT, Fuchs CS, Giovannucci E. Molecular pathological epidemiology of colorectal neoplasia: an emerging transdisciplinary and interdisciplinary field. *Gut* 2011; 60: 397-411. e. Ogino S, Lochhead P, Chan AT, Nishihara R, Cho E, Wolpin BM, Meyerhardt AJ, Meissner A, Schernhammer ES, Fuchs CS, Giovannucci E. Molecular pathological epidemiology of epigenetics: emerging integrative science to analyze environment, host, and disease. Mod Pathol 2013; 26: 465-84
9. Notes	
10. Essential Books (Text Books)	1-Textbook Review: AT Deyrup & GP Siegal. Practical Orthopedic Pathology. 344 pp. Elsevier. 2015 ($289 on Amazon.com). Reviewed by Jerad Gardner, MD, on 11 May 2015. Related ads to **molecular pathology books** i. **Principles of Molecular Pathology: 9781588290854: Medicine ...f**
11. Suggested Books	www.zapmeta.ws/**Molecular+Pathology+Books**

Course Name	Mol. Human Pathology
Course Code	B1-53

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**
Steps for Tissue Sectioning.	**3&4**	**a/2,a/4**	**b/2**	**N/A**	**d/1,d/2,d/4**
Cell Damage (Causes, Factors, Effects and Cautions).	**5&6**	**a/2,a/3**	**b/3**	**N/A**	**d/1,d/5,d/4**
Cell Inflammation (Acute and Chronic)..	**7&8**	**a/2**	**b/2**	**N/A**	**d/1,d/3**
Necrosis, Fibrosis and Cirrhosis.	**9&10**	**a/2**	**b/3**	**N/A**	**d/1,d/2,d/4**
Bilharisiasis, Amyloidosis , Granuloma and Different Pathological Phenomena.	**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:	B1-61	**Course Title:**	**Molecular structure of human chromosomes**				
No. units	3	**Lect.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects, collecting & developing information in molecular structure of human chromosomes. 2/2- Remodeling description of chromosomes structure and their dynamic changes during basic processes of metabolism of genetic material. 2/3- Summarizing the problem between human karyotype and diseases. 2/4- Simplifying research points to set them into educational curricula in the cell cycle and eukaryotic chromosomes. 2/5- Communicating with global scientific journals for paper publishing in the chromosomes abnormalities.

3. Intended Learning Outcomes of Course (ILO's)	
ss. Knowledge and Understanding:	Explain the mutual links between chemistry & structure 1-/a of biological macromolecules and the relationship between structure and function in molecular structure of human chromosomes. a/2- Clarify difference between chromosome, genome structure and functions. a/3- Express the chromosome abnormalities: how they arise, risks of occurrence and their detection a/4- Summarize the Changes in chromosomes number and Changes in chromosomes structure.
tt. Intellectual skills:	b/1- Find solution to the risks imposed during the treatment and analysis of molecular diagnostic diseases in molecular structure of human chromosomes. b/2- Innovate how single gene anomalies and chromosome aberrations of number and structure in humans . b/3- Distinguish between our current knowledge in Chromosome mapping & Human Karyotype.

	b/5- Evaluate information of eukaryotic chromosome structure & condensation.
uu. Practical and Professional Skills of course:	**Not Applicable (N/A)**
vv. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying molecular structure of human chromosomes. 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	& condensationEukaryotic Chromosome Structure
2	Eukaryotic Cell Division: Mitosis and Meiosis
3	Chromosomal sex determination systems
4	Chromosome mapping & Human Karyotype
5	Chromosome abnormalities (detecting Chromosomal abnormalities; prenatal testing)
6	Changes in chromosomes number (aneuploidy, Down syndrome and other Chromosomal defects polyploidy)
7	Changes in chromosomes structure (deletion, duplication and inversion)

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}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
jj. 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- Cell Biology -A laboratory handbook 2006, by: Celies E (ed). Elsevier Academic Press. ISBN: 0-12-164731-5 2- Chromosomes: Organization and function, 2003. by: Adrian T. Sumner. Blackwell Publishing ISBN: 0-632-05407-7
11. Suggested Books	1- Analyzing Chromosomes (basics from background to bench), 2010. **2-** Human Chromosomes (manual of basic techniques) , 2011.
12. 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 the department council: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Molecular structure of human 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
Eukaryotic Chromosome Structure & condensation	1&2	a/1	b/1, b/4	N/A	d/1, d/2
Eukaryotic Cell Division: Mitosis and Meiosis	3&4	a/2	b/1	N/A	d/1, d/4
Chromosomal sex determination systems	5&6	a/1	b/1	N/A	d/2, d/7
Chromosome mapping & Human Karyotype	7&8	a/1	b/1, b/3	N/A	d/2, d/5
Chromosome abnormalities (detecting Chromosomal abnormalities; prenatal testing)	9&10	a/3	b/2	N/A	d/3, d/6
Changes in chromosomes number (aneuploidy, Down syndrome and other Chromosomal defects ploidy)	11&12	a/4	b/3	N/A	d/3, d/6
Changes in chromosomes structure (deletion, duplication and inversion)	13&14	a/4	b/2	N/A	d/4, d/5, d/7

Course Coordinator: Prof. Dr. Kalil Halfawy

Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-62**	**Course Title:**	Molecular taxonomy				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects and identify molecular taxonomy. 2/2-Clarifying difference the principles and concepts methods of classification, a taxon, or group of organisms, can be specified in several different ways **2/3-** Evaluating and determine the evolution of the monophyletic group and a paraphyletic group 2/4- Understanding how to use taxonomy, evolutionary relationships to classify organisms 2/5- Summarizing professional decision taking for taxonomy and Kingdom Protista.

3. Intended Learning Outcomes of Course (ILO's)	
ww. Knowledge and Understanding:	1- Recall basics , tools of different research methodologies and /a scientific research ethics in molecular taxonomy. Clarify difference of molecular taxonomy and classify 2-/ a organisms . a/3 – Describes a reliable taxonomy for the assessment of biodiversity. a/4- Explain the Human Gene Mapping & Prokaryotic Gene map
xx. Intellectual skills:	b/1- Analyzing and evaluating information (measuring – devising – decision making) in the field of molecular taxonomy. 2- Innovate the suitable methods the application of genetic data /b in taxonomy. 3- Distinguish between the different Human Gene Mapping and /b Prokaryotic Gene map. 4- Evaluate and determine the information in the Evolutionary / b relationships b/5- Determine recent specific of taxonomy in bioinformatics'.

yy. Practical and Professional Skills of course:	c/1- Prepare modern modules of reports in molecular taxonomy research analysis for simplifying assessment by using English terminologies. c/2- Test the basic bioinformatics (DNA sequence alignment). c/3 Select different types Using bioinformatics tools of molecular taxonomy for obtaining research quality of molecular biology. 4- test technological tools in the professional practice training in /c sequencing and genotyping. 5- Write modern modules of reports in homologous characters /c to homoplastic characters
zz. General and Transferable Skills	1- Use internet and relative information technologies to improve /d his/her professional practice in molecular taxonomy. 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	Method of classification in molecular taxonomy
2	Sequences of DNA
3	Human Gene Mapping & Prokaryotic Gene map
4	Evolutionary taxonomy & classify organisms
5	compared homologous characters to homoplastic characters
6	Evolutionary relationships.
7	in bioinformatics Use molecular taxonomy

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)	8- Principles of Genetics by Robert H. Tamarin, Seventh Edition. Tata Mc-Graw Hill, India 2002 Edition. 9- A Celeste, S Petersen, P Romanienko, O Fernandez-Capetillo, HT Chen, O Sedelnikova, B Reina-San-Martin, V Coppola, E Meffre, MJ Difillippantonio, C Redon, D Pilch, A Olaru, M Eckhaus, RD Camerini-Otero, L Tessarollo, F Livak, K Maonova, WM Bonner, MC Nussenzweig, and A Nussenzweig (2002) Genomic Instability in Mice Lacking Histon H2AX. Science 296: 922-927. 10- Genetics : From Genomes by Hartwell L.H. & others Mc. Graw Hill
11. Suggested Books	• Genomes 3. Brown. John Wiley & Sons, 2010. 12. Genes VIIII. Lewin. Prentice Hall, 2011
13. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal

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

Matrix of Knowledge, Skills ILOs for Molecular Taxonomy Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Method of classification in molecular taxonomy	**1&2**	a/1,a/2	b/1,b/2	c/1	d/1, d/3
Sequences of DNA	**3&4**	a/1,a/2	b/2	c/1,c/3	d/2, d/3
Human Gene Mapping & Prokaryotic Gene map	**5&6**	a1,a3	b/1	c/2, c/4	d/2, d/5, d/6
Evolutionary taxonomy & classify organisms	**7&8**	a/1	b/3, b/4	c/2, c/3	d/1
compared homologous characters to homoplastic characters	**9&10**	a/3	b/1, b/2, b/5	c/2,c/5	d/2, d/4
Evolutionary relationships.	**11&12**	a/1,a2	b1,b2	c2, 3	d/1, d/3, d/6
Use molecular in taxonomy bioinformatics	**13&14**	a/1, a/3	b1,b2	c/1, c/5	d/2, d/4

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

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-64	**Course Title:**	Mutagenesis& carcinogensis				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Ph.D
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology (mutagenesis& carcinogenesis). 2/2-Clarifying difference the principles and concepts of Natural and chemical carcinogens. 2/3- Evaluating and determine the information in the field of interest in the human cell biology and mutation types and mechanisms. 2/4- Explaining the attitudes and ethical basis in scientific research and in DNA replication and repair. 2/5- Summarizing the multi-phases of carcinogenesis.

3. Intended Learning Outcomes of Course (ILO's)	
aaa. Knowledge and Understanding:	a/1- Explain the mutual links between chemistry & structure of biological macromolecules and the relationship between structure and function in mutagenesis& carcinogenesis. Divide the basics and ethics of scientific researches of 2-/ a mutagenesis& carcinogenesis fields of basic properties of genes and genomes. a/3 - Express the recent theories, methodologies, tools and ethics of scientific research the role of free radicals in cancer development. a/4- Remold the actual quality standards of the practical analysis and determination of anticancer agents from natural products.
bbb. Intellectual skills:	1- Evaluate professional decision taking for genetic /b engineering application of mutagenesis& carcinogenesis. 2- Innovate the suitable methods for different natural and /b

	chemical carcinogens. 3- Distinguish between the different aspects of gene /b regulation during cell growth and differentiation. 4- Suggest and determine the information in the field of /b anticancer agents from natural products to benefit from it in taking conclusion. b/5- Determine recent specific of response to a changing environment, as well as developments that are more related to commercial and mechanisms of carcinogenesis flied.
ccc. Practical and Professional Skills of course:	**Not Applicable (N/A)**
ddd. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying mutagenesis and carcinogenesis. 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
2	Anticancer agents from natural products
3	Mechanisms of carcinogenesis
4	Natural and chemical carcinogens
5	Mutation types and mechanisms
6	DNA replication and repair
7	Oxidative stress and 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:	
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)	-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 coordinator: Prof. Dr. Shaden Muawia
Prof.Dr. Mohamed Elshal

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

Matrix of Knowledge, Skills ILOs for Mutagenesis& carcinogensis 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, a/2	b/1, b/4	N/A	d/1, d/4,d/6
Anticancer agents from natural products	3&4	a/1, a/3	b/1, b/5	N/A	d/2, d/4
Mechanisms of carcinogenesis	5&6	a/1, a/2	b/1, b/3	N/A	d/1, d/3, d/5
Natural and chemical carcinogens	7&8	a/1, a/3, a/4	b/2, b/5	N/A	d/3, d/6
Mutation types and mechanisms	9&10	a/2, a/3	b/1, b/2	N/A	d/1, d/3, d/6
DNA replication and repair	11&12	a/2, a/4	b/2, b/3	N/A	d/1, d/4, d/7
Oxidative stress and cancer	13&14	a/2, a/4	b/2, b/4	N/A	d/5, d/4, d/7

Course Teach: 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:	**B1-71**	**Course Title:**	**Physiological and biochemical of host pathogen relationship**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology (Physiological and biochemical of host pathogen relationship). 2/2-Clarifying difference the principles and concepts of the different methods used to study host-pathogen interaction on a molecular level. 2/3- Evaluating and determine the information in the field of the interaction between the host and the pathogen 2/4- Explaining the attitudes of the mechanisms infection and to identify the "Achilles' heel" of the pathogen of interest.

3. Intended Learning Outcomes of Course (ILO's)	
eee. Knowledge and Understanding:	a/1- Explain the mutual links between chemistry & structure of biological macromolecules and the relationship between structure and function in gene regulation system . Summarize basics and ethics of scientific researches 2-/ a of gene expression is Physiological and biochemical of host pathogen relationship. a/3 - Express the recent theories, methodologies, tools and ethics of scientific research the mechanisms of action of some toxic agents like pesticides and insecticides a/4- Remolding the relationship between host and their host pathogen.
fff. Intellectual skills:	1- Memorize scientific technical terms used in scientific /b researches of Physiological and biochemical of host pathogen relationship. 2- Innovate the suitable methods for different of specific /b proteins and enzymes in Physiological and biochemical of host pathogen relationship.

	3- Distinguish between the Characterizing Host Receptor /b Recognition by Individual Bacterial Pathogens 4- Evaluate and determine the information in the /b Interaction of Fungal Pathogens with Primary Cells from the Mammalian Innate Immune System.
ggg. Practical and Professional Skills of course:	**Not Applicable (N/A)**
hhh. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying Physiological and biochemical of host pathogen relationship. 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	Bacterial Pathogens
2	Transcriptome Analyses in the Interaction of Bacterial Pathogens with Mammalian Host Cells
3	Characterizing Host Receptor Recognition by Individual Bacterial Pathogens
4	Systems for Studying the Interaction of Fungal Pathogens with Primary Cells from the Mammalian Innate Immune System
5	Host Responses & Fungal and Bacterial Killing by Neutrophils
6	Proteomic Profiling of Serologic Response During Host-Commensal and Host-Pathogen Interactions
7	Modulation of Caspase Activation by *Toxoplasma gondii* & Diagnostics 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:	
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 15% 10 10% 15 15% 60 60% Total=100 100%

8. List of References:	
9. Notes	
10. Essential Books (Text Books)	Pitarch, A., Molero, G., Monteoliva, L., Thomas, D. P., López-Ribot, J. L., Nombela, C., and Gil, C. (2007) Proteomics in *Candida* species, in *Candida: Comparative and FunctionalGenomics* (d'Enfert, C. and Hube, B., eds), Caister Academic Press, UK, pp. 169–194.
11. Suggested Books	Host-Pathogen Interactions prtocols and methods by Steffen Rupp and Kai Sohn (2009)
12. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal http://www.cellbio.com/protocols.html

Course coordinator: Ass. Prof. Dr. Khalid Bassiouny

Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Physiological and biochemical of host pathogen relationship Course

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Protein –protein interaction	**1&2**	**a/3**	**b/1, b/2**	**N/A**	**d/1, d/6**
Core promoter and promoter-proximal elements	**3&4**	**a/3**	**b/1, b/2**	**N/A**	**d/2, d/4**
Trans control of transcription & Cis-acting sequences in transcriptional regulation	**5&6**	**a/3, a/4**	**b/1, b/4**	**N/A**	**d/1, d/3,**
Tissue-specific regulation of transcription	**7&8**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/3, d/6**
Dissecting eukaryotic regulatory elements	**9&10**	**a/2, a/4**	**b/1, b/3**	**N/A**	**d/1, d/5, d/6**
Classify of gene expression eukaryotic	**11&12**	**a/1, a/2**	**b/1, b/4**	**N/A**	**d/1, d/4, d/7**
Regulatory elements and dominant mutations	**13&14**	**a/1**	**b/1, b/42**	**N/A**	**d/1, d/4, d/7**

Course coordinator: Ass. Prof. Dr. Khalid Bassiouny

Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**B1-73**	**Course Title:**	**Plant genetic transformation**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1-Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology and plant genetic transformation 2/2- Simplifying research points to set them into educational curricula in plant genetic transformation. 2/3-Showing awareness to Sadat's sector agriculture researching problems determine problems and find solutions 2/4- Communicating with global magazines for paper publishing in the field of plant genetic transformation

3. Intended Learning Outcomes of Course (ILO's)	
iii. Knowledge and Understanding:	a/1- Clarify difference the principles and concepts of genetics, genetic engineering and molecular biology a/2- Divide characterize the different types of selectable markers used for genetic element transformation in plant and different tools for their removal. a/3- Explain the relationship between transformation vectors and different genomes structure in plant cell a/4- Summarize the recent theories, methodologies, tools and ethics of production of antibodies and pharmaceutically useful proteins in plants.
jjj. Intellectual skills:	b/1- Evaluate professional decision taking for genetic engineering application of agriculture b/2- Distinguish between the different applicable systems that are used for industrial transformed plants. b/3- Interpret results of different methods of plant genetic transformation. b/4- Innovate the suitable methods of genetically transformed element for desired biological purpose. b/5- Suggest paraphrase English technical terms used in

	scientific researches of the gene for developing transgenic plants.
kkk. Practical and Professional Skills of course:	Not Applicable (N/A)
lll. General and Transferable Skills	d/1- Work on team for using all methods with public, collegeous and appropriate authorities. d/2- Show management skills for using 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 plant genetic transformation course topics d/4- Communicate with others & Manage time effectively. d/5- Show self learning abilities in situation comparable to his level. d/6- Use audio & video means for Displaying information to learn independently and seek continuous learning in plant genetic transformation.

	4. Course Contents:
No.	**Topic**
1&2	Gene Identification, Plant nuclear genes, plastid genes, mitochondrial genes and plastid transformation.
3&4	Introducing the gene for developing transgenic plants, Agrobacterium and Ti plasmid.
5&6	Physical method of plant transformation, Marker and selectable genes.
7&8	Transformation Steps, Selection of transformants.
9&10	Plant genetic engineering for herbicide resistance, pest resistance and etc.
11&12	Production of antibodies and pharmaceutically useful proteins in plants.
13&14	Intellectual property rights. Biosafty regulations relating to transgenic plant.

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}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
vv. 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)	-Jackson J. and Linskens H (2010). Genetic Transformation of Plants (Molecular Methods of Plant Analysis). Springer ISBN-13: 978-3642055539 -Charles Neal Stewart, Alisher Touraev, Vitaly Citovsky and Tzvi Tzfira (2011). Plant Transformation Technologies. Published by Wiley-Blackwell. ISBN-13: 978-0813821955 -Balram Sharma (2008). Plant Tissue Culture and Transformation Techniques. Publisher, Daya Publishing House. ISBN-13: 978-8170355274. -Charles Neal Stewart, Alisher Touraev, Vitaly Citovsky and Tzvi Tzfira (2011). Plant Transformation Technologies. Publisher, Wiley-Blackwell. ISBN-13: 978-0813821955 -James A. Birchler (2010). Plant Chromosome Engineering: Methods and Protocols (Methods in Molecular Biology). Publisher, Humana Press ISBN-13: 978-1617379567
11. Suggested Books	-Ashwani Kumar and Sudhir K. Sopory. Applications of Plant Biotechnology: In vitro Propagation, Plant Transformations and Secondary Metabolite Production (2010). Publisher: I K International Publishing House .ISBN-13: 978-9380026930. -Duong Tan Nhut, Kiem Tran Thanh Van, B.

	Van Le and Trevor A. Thorpe (2010). Thin Cell Layer Culture System: Regeneration and Transformation Applications. Publisher: Springer. ISBN-13: 978-9048162598
d -Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewin. genetics.www.prancipal

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Nasser Hussein Abbas

Head of Department: Prof.Dr. Ibrahim Helmy

Course Contents	Week No.	a-Knowledge and Understanding	b-Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Gene Identification, Plant nuclear genes, plastid genes, mitochondrial genes and plastid transformation.	**1&2**	**a/1,a/2**	**b/1**	**N/A**	**d/2,d/4**
Introducing the gene for developing transgenic plants, Agrobacterium and Ti plasmid.	**3&4**	**a/1,a/2**	**b/1**	**N/A**	**d/2,d/4**
Physical method of plant transformation, Marker and selectable genes.	**5&6**	**a/1,a2,a4**	**b/1,b/2**	**N/A**	**d/1, d/2,d/4**
Transformation Steps, Selection of transformants.	**7&8**	**a1,a3**	**b/1,b/3**	**N/A**	**d/1, d/3**
Plant genetic engineering for herbicide resistance, pest resistance and etc.	**9&10**	**a/3**	**b/2, b/5**	**N/A**	**d/1, d/2,d5**
Production of antibodies and pharmaceutically useful proteins in plants.	**11&12**	**a1,a2**	**b/1,b/2**	**N/A**	**d/3, d/5,d/6**
Intellectual property rights. Biosafty regulations relating to transgenic plant.	**13&14**	**a/2,a/4**	**b/2,b/4**	**N/A**	**d/2,d/4,d6**

Course coordinator: Prof. Dr. Mahmoud Nasr
Dr. Nasser Hussein Abbas

Head of Department: Prof.Dr. Ibrahim Helmy

epartment: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	B1-86	**Course Title:**	Techniques for the analysis of complex genome				
No. units	3	**Lect.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Writing papers in molecular biology & using display devices , publishing tool & scientific conferences . 2/2- Explaining the theories suggest that ageing results from the accumulation of analysis of complex genome. 2/3- Clarifying difference the principles and concepts the sequencing of DNA. 2/4- Evaluating and determine the information in the field of analysis bioinformatics in Techniques for the analysis of complex genome. **2/5** Communicating with world scientific journal for paper publishing.

3. Intended Learning Outcomes of Course (ILO's)	
mmm. Knowledge and Understanding:	a/1- Express the recent theories, methodologies, tools and ethics of scientific research molecular biology field in Techniques for the analysis of complex genome. a/2- Divide the Genome-Wide Analysis and fine mapping. a/3- Summarize allele sharing (nonparametric) methods for sib-pairs and extended families a/4- Explain the linkage analysis and the LINKAGE program.
nnn. Intellectual skills:	1- Suggest Paraphrase English technical terms used in /b scientific researches in Techniques for the analysis of complex. b/2- Distinguish laboratory diagnosis and Genome-Wide Analysis. b/3- Find solutions of Complete penetrance, penetrances for autosomal recessive and x-linked inheritance b/4- Evaluate according to evidence fine mapping & linkage

	admixture.
ooo. Practical and Professional Skills of course:	Not Applicable (N/A)
ppp. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying various techniques for the analysis of complex genome. 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	Genome-Wide Analysis
2	Parametric methods (two-point and multipoint analysis)
3	Allele sharing (nonparametric) methods for sib-pairs and extended families (two-point and multipoint analysis)
4	Fine mapping & linkage admixture
5	LINUX/UNIX, linkage analysis and the LINKAGE program
6	Complete penetrance, penetrances for autosomal recessive and x-linked inheritance, allele frequency estimation, loops, detecting genotyping errors and multipoint linkage analysis.
7	Linkage disequilibrium, tag SNPs selection and haplotype reconstruction

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

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

7. Student Assessment:	
ww. Assessment Methods:	- work on team - Midterm - Oral - Written
xx. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
yy. 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)	-Nelson Text book of pediatrics - Bower JM, Bolouri H (Eds.) Computational modeling of genetic and biochemical networks (Computational molecular biology). MIT Press, 2001. - De Jong H. (2002) "Modeling and simulation of genetic regulatory systems: A literature review", J. Computational Biology 9: 67-103.
11. Suggested Books	-Genes VIII. Lewin. Prentice Hall, 2010
12. Periodicals, Web Sites, … etc ...	…www.prenhall.com/lewis.

Course coordinator: Prof. Dr. Kalil Halfawy
Dr. Hany Kalil
Head of the department council: Prof. Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Education 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-Wide Analysis	**1&2**	**a/1, a/2**	**b/1**	**N/A**	**d/1, d/2**
parametric methods (two-point and multipoint analysis)	**3&4**	**a/2**	**b/2**	**NA**	**d/1, d/4**
allele sharing (nonparametric) methods for sib-pairs and extended families (two-point and multipoint analysis)	**5&6**	**a/3**	**b/1,b/2**	**N/A**	**d/2, d/3**
fine mapping & linkage admixture	**7&8**	**a/2**	**b/1, b/4**	**N/A**	**d/2, d/5**
Getting started using LINUX/UNIX, introduction to linkage analysis, file system used by the LINKAGE program	**9&10**	**a/1, a/3**	**b/4**	**N/A**	**d/3, d/4, d/6**
Complete penetrance, penetr ances for autosomal recessive and x-linked inheritance, allele frequency estimation, loops, detecting genotyping errors and multipoint linkage analysis.	**11&12**	**a/1, a/4**	**b/2**	**N/A**	**d/3, d/6**
Linkage disequilibrium, tag SNPs selection and haplotype reconstruction	**13&14**	**a/4**	**b/1, b/3**	**N/A**	**d/1, d/4, d/5**

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

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	C-27	**Course Title:**	**Experimental Biochemistry**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Developing depth knowledge of the immune system with emphasis Experimental Biochemistry and clinical immunology. 2/2-Clarifying knowledge of the fundamental immune processes needed for further study in this field while concentrating on the considerable inter-dependent co-ordination of Biochemical assays that occurs during the development of an biochemistry reaction. 2/3- Evaluating and determine of the biochemical assays responsible for the drugs observed in animal models and humans in relation to autoimmune disease. 2/4- Explaining how the Radioactivity measurements and deals with different kinds of infectious agents and oncogenic challenge. 2/5- Expressing and differentiate between the gel electrophoresis and characterization of biomolecules including enzymes

3. Intended Learning Outcomes of Course (ILO's)	
qqq. Knowledge and Understanding:	a/1- Describe a detailed knowledge of the cell types and soluble factors involved in immune responses. Classify how the biochemical assays attempts to 2-/a maintain the host's integrity against a wide variety of infectious agents including viruses, bacteria, fungi, protozoan and metazoan parasites. a/3 - Summarize the biochemistry basis of autoimmune disease in animal models and humans. a/4- Remolding an understanding of the DNA sequence analysis and bioinformatics
rrr. Intellectual skills:	1- Compare between different methods of molecular /b alterations and induced diseases. b/2- Interpret different information to solve the problems of develop the performance in the applications of biochemical assay.

	3- Distinguish between the different aspects of /b Radioactivity measurements and cancer. 4- Evaluate and determine the information in the field /b autoimmune disease and its relationship to human disease. b/5- Determine recent experiment biochemistry techniques used for studying daises.
sss. Practical and Professional Skills of course:	1- Apply analytical methods for determination and /c analysis DNA structure, function, polymorphism. c/2- Diagnose an individual research project that will normally include laboratory experiments of applications: gel electrophoresis and HPLC. 3 Select different types of methods and tools of /c experiment biochemistry for studying Liquid column chromatography for detection parameter. c/4- Test technological tools in the diagnosis of DNA sequence analysis. c/5 - Prepare modern modules of Characterization of biomolecules including enzymes.
ttt. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in experiment 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 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	Biochemical assays
2	Liquid column chromatography
3	Radioactivity measurements
4	DNA sequence analysis
5	Gel electrophoresis
6	Gel filtration and HPLC
7	Characterization of biomolecules including enzymes

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:	
zz. Assessment Methods:	- Semester works - Midterm exam - Oral exam - Written (Final) Exam
aaa. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
bbb. 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; 5^{th} 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. Samir Elmasry
Dr. Sheriff Mohsen Elsherbini
Dr. Mohamed Yonies
Head of the department council: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Experimental 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
Biochemical assays	1&2	a/1, a/2	b/1, b/4	c/1, c/4	d/1, d/4,d/6
Liquid column chromatography	3&4	a/1, a/3	b/1, b/5	c/1, c/2	d/2, d/4
Radioactivity measurements	5&6	a/2	b/3	c/3	d/1, d/3, d/5
DNA sequence analysis	7&8	a/3, a/4	b/2, b/5	c/2, c/5	d/3, d/6
Gel electrophoresis	9&10	a/2, a/3	b/2	c/5	d/1, d/3, d/6
Gel filtration and HPLC	11&12	a/4	b/2, b/3	c/2, c/4	d/1, d/4, d/7
Characterization of biomolecules including enzymes	13&14	a/2, a/4	b/2, b/4	c/3, c/5	d/5, d/4, d/7

Course coordinator: Prof. Dr. Samir Elmasry
Dr. Sheriff Mohsen Elsherbini
Dr. Mohamed Yonies
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	C-43	**Course Title:**	Human cancer (practical approach)				
No. units	3	**Lec.**	3	**App.**	-	**Level**	Ph.D
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 (Human cancer (practical approach). 2/2-Clarifying difference the principles and concepts of genetic imprinting and cancer. 2/3- Evaluating and determine the information in the field of interest in the human cell biology and mutation types and mechanisms. 2/4- Remolding the attitudes and ethical basis in scientific research and in Cell signaling and signal transduction. 2/5- Expressing and differentiate between the genetic materials, and applying this in molecular diagnosis of the diseases.

3. Intended Learning Outcomes of Course (ILO's)	
uuu. Knowledge and Understanding:	a/1- Describe basic facts and theories of the biotechnology use in molecular biology diagnosis, control of certain diseases by human cancer (practical approach). Classify main scientific advances of using the quality 2-/a assurance principles in human cancer (practical approach) applications on environmental diseases. a/3 - Summarize main basics & ethics of scientific researches of molecular targets and drug resistance fields. a/4- Explain the actual quality standards of the practical analysis and determination of cell signaling and signal transduction.
vvv. Intellectual skills:	1- Compare between different methods of molecular /b alterations and induced diseases. b/2- Distinguish different information to solve the problems of develop the performance in the applications of therapy

	diseases. 3- Suggest the different aspects of Genetic imprinting and /b cancer. 4- Evaluate and determine the information in the field of /b regulation of transcription and epigenetics to benefit from it in taking conclusion. b/5- Determine recent specific of response to a changing environment, as well as developments that are more related to commercial and applications: genes, cancer and therapy flied.
www. Practical and Professional Skills of course:	1- Apply analytical methods for determination and /c analysis experimental models of different diseases diagnose for study. c/2- Diagnose an individual research project that will normally include laboratory experiments of applications: genes, cancer and therapy. 3 Select different types Using methods and tools of /c molecular biology for obtaining research quality of Molecular targets and drug resistance. 4- Prepare technological tools in the professional practice /c extract and purify the human cancer samples from different biological source and measurements. c/5 – Write the modern modules of reports in genetic imprinting and cancer research analysis for simplifying assessment by using English terminologies.
xxx. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying human cancer (practical approach). 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
2	Genetics and cytogenetics
3	Genetic imprinting and cancer
4	Cell signalling and signal transduction
5	Applications: genes, cancer and therapy
6	Regulation of transcription and epigenetics
7	Molecular targets and drug resistance

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:		
ccc.	**Assessment Methods:**	- Semester works - Midterm exam - Oral exam - Written (Final) Exam
ddd.	**Assessment Schedule**	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
eee.	**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 coordinator: Prof. Dr. Shaden Muawia
Prof.Dr. Mohamed Elshal
Dr. Hany Kalil
Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Human cancer (practical approach) 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, a/2**	**b/1, b/4**	**c/1, c/4**	**d/1, d/4,d/6**
Genetics and cytogenetics	**3&4**	**a/1, a/3**	**b/1, b/5**	**c/1, c/2**	**d/2, d/4**
Genetic imprinting and cancer	**5&6**	**a/1, a/2**	**b/1, b/3**	**c/2, c/3**	**d/1, d/3, d/5**
Cell signalling and signal transduction	**7&8**	**a/1, a/3, a/4**	**b/2, b/5**	**c/2, c/5**	**d/3, d/6**
Applications: genes, cancer and therapy	**9&10**	**a/2, a/3**	**b/1, b/2**	**c/1, c/5**	**d/1, d/3, d/6**
Regulation of transcription and epigenetics	**11&12**	**a/2, a/4**	**b/2, b/3**	**c/2, c/4**	**d/1, d/4, d/7**
Molecular targets and drug resistance	**13&14**	**a/2, a/4**	**b/2, b/4**	**c/3, c/5**	**d/5, d/4, d/7**

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

Department: **Molecular Biology**

Course Specifications

13. Course information:							
Course Code:	**C-82**	**Course Title:**	**Methods in protein analysis**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	**PhD**
Department	**Molecular Biology**						

14. Course Aims	
	2/1- Determining research subjects , collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular biology in methods in protein analysis. 2/2- Simplifying research points to set them into educational curricula in molecular biology of protein analysis. 2/3- Decision making in determining research points, answering questions in scientific seminars, admitting research plans of Post-Transitional modifications. 2/4- Expressing and appreciation of the biological protein forms 2/5- Communicating with global magazines for paper publishing of the protein stability & levels of protein structure.

15. Intended Learning Outcomes of Course (ILO's)	
yyy. Knowledge and Understanding:	a/1- Summarize main basics & ethics of scientific researches of molecular biotechnology fields of methods in protein analysis. a/2- Remolding the actual quality standards of the practical analysis and determination of amino acid configuration and their properties. a/3- Divide the fundamental concepts of biochemistry and the technical methodology in of protein folding, its levels and post-transitional modifications. a/4- Clarify difference between structure and function of proteins. a/5- Express the concept of protein co-linearity with the genetic material.
zzz. Intellectual skills:	b/1- Evaluate and determine the information in the field of molecular biology in methods in protein analysis to benefit from it in taking conclusion. b/2- Interpret Results of different methods n protein analysis. b/3- Distinguish the relation between amino acid and DNA

	sequence b/4- Suggest Paraphrase English technical terms used in scientific researches of protein synthesis and DNA central dogma.
aaaa. Practical and Professional Skills of course:	c/1- Test the different analytical methods for analysis of protein analysis. c/2- Use technological tools in the professional practice of proteins assays. c/3- Diagnose an individual research project that will normally include laboratory experiments of amino acid configuration and their properties. c/4- Select different types using methods and tools of molecular biology for obtaining research quality in protein biological forms and its proper confirmation structure at the cellular level.
bbbb. General and Transferable Skills	1- Use internet and relative information technologies to /d improve his/her professional practice in studying the different methods in protein analysis. 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.

	16. Course Contents:
No.	**Topic**
1	Biological importance and functions of proteins
2	Amino Acid configuration and their properties
3	Classification of amino acids (Different views)
4	Nomenclature and structure of different amino acids
5	Protein Stability & Levels of Protein Structure
6	Protein synthesis and DNA central dogma
7	Post-Transitional Modifications & Proteins Assays

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

20. List of References:	
21. Course Notes	
22. Essential Books (Text Books)	- Proteins structure and function by David Whiteford (2005) , printed by John Wiley & Sons, Ltd - The protein protocols hand book by John M. walker (2002), Humana Press Inc.
23. Suggested Books	- Text book of Biochemistry - Protein Purification Protocols by Paul Cutler from Methods in Molecular Biology, vol. 244 Humana Press Inc., Totowa, NJ
24. Periodicals, Web Sites, … etc ...	- Journal of Biological Chemistry(JBC).www.jbc.com …www.biochemistryonline.com. - http://www.cellbio.com/protocols.html , Methods in molecular biology (Feb., 2009)

Matrix of Knowledge, Skills ILOs for Methods in protein analysis Course

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Biological importance and functions of proteins	**1&2**	**a/1, a/2**	**b/1**	**c/1, c/4**	**d/1, d/2, d/4**
Amino Acid configuration and their properties	**3&4**	**a/2**	**b/1, b/2**	**c/3**	**d/1, d/3**
Classification of amino acids (Different views)	**5&6**	**a/4**	**b/2, b/3**	**c/4**	**d/1, d/4,d/7**
Nomenclature and structure of different amino acids	**7&8**	**a/2, a/3**	**b/3**	**c/2, c/3**	**d/1, d/3, d/4**
Protein Stability & Levels of Protein Structure	**9&10**	**a/1, a/2**	**b/1, b/4**	**c/2, c/4**	**d/1, d/5, d/6**
Protein synthesis and DNA central dogma	**11&12**	**a/3, a/5**	**b/1, b/2**	**c/2, c/5**	**d/1, d/4, d/7**
Post-Transitional Modifications & Proteins Assays	**13&14**	**a/1, a/5**	**b/1, b/4**	**c/1, c/2**	**d/1, d/5, d/6**

Course coordinator: Prof. Dr. Samir El-Masry
Dr. Kalied Bassiouny
Head of Department: Prof.Dr. Ibrahim Helmy

Department: **Molecular Biology**

Course Specifications

1. Course information:							
Course Code:	**C-64**	**Course Title:**	**Methods in Immunology (III)**				
No. Units	**3**	**Lec.**	**3**	**App.**	**-**	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
Manipulate course topics to be aims	2/1. Developing depth knowledge and using appropriate technological means in molecular biotechnology 2/2. Clarifying knowledge to the general assays important in the field of molecular immunology. 2/3. Evaluating and determine 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 diagnostic applications of some immunological assays. 2/6. Explaining a good laboratory practicing rules required to study molecular immunology.

3. Intended Learning Outcomes of Course (ILO's)	
cccc. 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 DNA and RNA a/4. Express how to prepare RNA a/5. Describe Method of RNA purification a/6. Summarize types of Cell lines a/7. Explain working with microscope
dddd. Intellectual skills:	Interpret different methods of DNA extraction 1. /b b/2. Interpret different types of PCR. b/3. Integrate the information about RNA Extraction Methods b/4. Distinguish between RNA and non-coding RNA b/5. Interpret Different types of Cell lines

	b/6. Integrate the information of Microscopes
eeee. Practical and Professional Skills of course:	1. Test how to extract DNA by different methods /c 2 Execute how to extract RNA in the laboratory /c 3. Adjust and calculate gene polymorphism reaction/c 4. Estimate types of cell lines /c c/5. Test microscope analysis methods c/5. Select the molecular experimental results and determine their strength and validity in molecular immunology field c/6. Write the research presentations and execute computational tools and packages
ffff. General and Transferable Skills	1- Use Audio & Video Means for Displaying immune /d 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 method 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.

	4. Course Contents:
	Topic
1	Methods of DNA/RNA extraction and purification
2	PCR primer design and Types of PCR and application in immunology field
3	Gene polymorphism
4	Methods of RNA extraction and Purification
5	Non Coding RNA
6	Working with Cell Lines
7	Microscope

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:	
iii. Assessment Methods:	- Semester works - Midterm exam - Oral exam - Written (Final) Exam
jjj. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
kkk. 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- Antibody engineering (2^{nd} ed) Oxford University Press. Inc (2005). **12-** Hand book of human Immunology, CRC Press (2004). **13-** Immunology methods manual (2008) Academic Press.
11. Suggested Books	**1-** Current Protocols in Immunology (2010) 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: Ass. Prof. Dr. Roba Mohamed Talaat
Dr. Sheriff Mohsen Elsherbini
Dr. Yasser Bastawy Mohamed

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

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

Course Contents	Week No.	a-Knowledge and Understanding	b- Intellectual skills	c-Practical and Professional Skills of course	d-General and Transferable Skills
Methods of DNA/RNA extraction and purification	**1&2**	**a/1, a/3**	**b/1**	**c/1, c/2,**	**d/1, d/2, d/4**
PCR primer design and Types of PCR and application in immunology field	**3&4**	**a/1, a/2**	**b/1, b/2**	**c/1,c/2, c/3**	**d/1, d/2, d/3,d4,d/5, d/6**
Gene polymorphism	**5&6**	**a/1, a/2**	**b/1, b/2**	**c/1, c/3**	**d/1, d/2, d/4**
Methods of RNA extraction and Purification	**7&8**	**a/4, a/5**	**b/1b/4**	**c/1,c/3**	**d/1, d/2, d/5, d/6**
Non Coding RNA	**9&10**	**a/1, a/5**	**b/1, b/4**	**c/1,c/3**	**d/1, d/2, d/4, d/5**
Working with Cell Lines	**11&12**	**a/1, a/6**	**,b/5**	**c/1,c/4**	**d/1, d/2, d/4, d/5**
Microscope	**13&14**	**a/1, a/7**	**b/6**	**c/1,c/5**	**d/1, d/2, d/5, d/6**

Course coordinator**: Ass. Prof. Dr. Roba Mohamed Talaat**
Dr. Sherif Mohsen Elsherbini
Dr. Yasser Bastawy Mohamed
Head of Department **: Prof.Dr. Ibrahim Helmy**

Department : **Molecular biology**

Course Specifications

1. Course information:							
Course Code:	**C-75**	**Course Title:**	**Methods in Molecular parasitology**				
No. Units	**3**	**Lec.**	**2**	**App.**	**2**	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Decision making in determining research points, answering questions in scientific seminars, admitting research plans in methods in molecular parasitology. 2/2- Clarifying difference between types of parasitology. 2/3- Explaining techniques of molecular Biology that used in detection of parasites. 2/4-Linking between molecular parasitology and its application in molecular diagnosis of different parasitic diseases.

3. Intended Learning Outcomes of Course (ILO's)	
gggg. Knowledge and Understanding:	a/1- Explain the procedures used in both qualitative and quantitative biological analysis in methods in molecular parasitology. a/2- Express use of molecular database in parasitology field. a/3- Summarize assays used for analysis of nucleic acid and protein of different parasites a/4- Divide between methods used in detection of parasite protein and nucleic acids. a/5- Clarify difference between the methods of diagnosis and treatment for human parasites.
hhhh. Intellectual skills:	b/1 - Distinguish between the different aspects of molecular pathology and molecular human genetic. 2- Design classical methods of detection of parasites and /b advanced molecular techniques. b/3- Suggest new methods in analysis of database of parasites. 4- Determine problems use of immunoblotting and ELISA /b techniques in detection of parasite antigen.
iiii. Practical and Professional	1- Prepare techniques and tools used in molecular biology /c

Skills of course:	of parasites. c/2 -Select the nucleic acid and protein of parasites techniques. c/3- Select between different methods to find suitable way of detection parasites. c/4 -Test and estimate the specificity and sensitivity of techniques in detection of parasites.
jjjj. General and Transferable Skills	1- Use Audio & Video means for displaying molecular /d methods of detection of parasites. 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	Introduction
2	Preparation of DNA and RNA from parasite genes
3	Isolation of DNA and RNA from Parasite genes
4	Amplification of parasite genes using synthetic oligonucleotides and PCR
5	Protein Extraction of Parasitic protein
6	Application of polyacrylamide gel electrophoresis in detection of parasite protein.
7	Immunoblotting and ELISA in detection of parasite antigen

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:	
lll. Assessment Methods:	**a.** Semester work **b.** Midterm exam

	c. Oral exam **d.** Written (final) exam
mmm. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.
nnn. 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)	- Protocols in molecular parasitology, Hyde O E. Hyde. 1993, Springer Inc. - principles and practice of clinical parasitology, Gillespie S.H. and Person, R.D., 2001, Wiley Inc.
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

Curse coordinator: Prof. Dr. Roba Mohamed Talaat
Dr. Yasser Bastawy Mohamed

Head of Department: Prof.Dr. Ibrahim Helmy

Matrix of Knowledge, Skills ILOs for Methods in 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
Introduction	**1&2**	a/1, a/2	b/1, b/3	c/1	d/1, d/2, d/4
Preparation of DNA and RNA from parasite genes	**3&4**	a/1, a/3, a/4, a/5	b/1, b/2,b3	c/2, c/3	d/1, d/3
Isolation of DNA and RNA from Parasite genes	**5&6**	a/1, a/3, a/4, a/5	b/1,b/2, b/3	c/2, c/3	d/1, d/4
Amplification of parasite genes using synthetic oligonucleotides and PCR	**7&8**	a/1, a/3, a/4, a/5	b/1, b/2, b/3	c/2, c/3	d/1, d/5, d/6
Protein Extraction of Parasitic protein	**9&10**	a/1, a/3, a/4, a/5	b/1, b/2, b/3	c/2, c/3	d/1, d/4, d/5
Application of polyacrylamide gel electrophoresis in detection of parasite protein.	**11&12**	a/1, a/3, a/4, a/5	b/1, b/2, b/3	c/2, c/3	d/1, d/4, d/5
Immunoblotting and ELISA in detection of parasite antigen	**13&14**	a/2, a/3, a/4, a/5	b/1, b/3, b/4	c/2, c/3, c/4	d/1, d/5, d/6

Course coordinator: **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:	**B5-32**	**Course Title:**	**Monoclonal Antibodies**				
No. units	3	**Lec.**	3	**App.**	-	**Level**	PhD
Department	**Molecular Biology**						

2. Course Aims	
	2/1- Determining research subjects, collecting & developing information and applying analytical and critical approach to knowledge in the field of molecular Immunology 2/2- Explaining the importance of the polyclonal and monoclonal antibodies and how it can be manipulated 2/3- Introducing students to different applications of monoclonal and polyclonal applications.

3. Intended Learning Outcomes of Course (ILO's)	
kkkk. Knowledge and Understanding:	Clarify difference the principles and concepts of 1. /a engineering antibodies in laboratories 2. Summarize antibody structure and genetic control of /a antibody specificities a/3.Express rules of antibody production and purification 4. Divide methods used in polyclonal antibodies from that /a used in monoclonal production techniques 5. Explain the various application of antibodies (in /a laboratory methods, in medicine…etc)
llll. Intellectual skills:	1. Interpret results of different methods of molecular /b immunology. b/2. Evaluate the different aspects of polyclonal and monoclonal antibody production 3. Design the experiment that could be used in antibody /b production in laboratory 4. Distinguish between different methods of antibody /b purification b/5. Innovate the application of antibody as diagnostic or therapeutic rule b/6. Suggest the new strategies used in the field of antibody production.
mmmm. Practical and	Not Applicable (N/A)

Professional Skills of course:	
nnnn. General and Transferable Skills	d/1. Use Audio & Video Means For Displaying monoclonal and polyclonal production. d/2. Practice self appraisal and determines his/her learning needs. d/3. Use different sources of information to obtain data for a given 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.

	4. Course Contents:
No.	**Topic**
1	Introduction to antibody structure production and genetic level
2	Production of polyclonal antibody
3	Production of monoclonal antibody
4	Purification of prepared antibodies
5	Diagnostic applications of polyclonal/monoclonal antibodies
6	Therapeutic applications of polyclonal/monoclonal antibodies
7	New strategies in antibody production

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:	
ooo. Assessment Methods:	**Semester work** **Midterm exam** **Oral exam** **Written (final) exam**
ppp. Assessment Schedule	- (5^{th}&10^{th}) - (6^{th}) Week - (14^{th}) Week - (15^{th}) Week.

qqq. 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)	Essential Immunology (8th Edition). Ivan M Roitt. Oxford Immunology and serology in Laboratory Medicine (2nd Edition) (1996). Mosby Inc. Immunoassay handbook (2nd Edition) (2001). David Wild, Nature Publishing Group
11. Suggested Books	Essential Immunology (10th Edition) (2010).
12. Periodicals, Web Sites, … etc ...	www.bio.davidson.edu/Courses/molbio/MolStudents/.../mab.html ocw.mit.edu/courses/biology/7-343-protein.../antibodies.pdf

Course coordinator: Ass. Prof. Dr. Roba Mohamed Talaat
Head of Department : **Prof.Dr. Ibrahim Helmy**

Matrix of Knowledge, Skills ILOs for Monoclonal Antibodies 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 antibody structure production and genetic level	**1&2**	**a/1, a/2**	**b/1, b/2**	**N/A**	**d/1, d/2, d/4**
Production of polyclonal antibody	**3&4**	**a/1, a/2, a/3**	**b/2, b/3**	**N/A**	**d/1, d/3**
Production of monoclonal antibody	**5&6**	**a/1, a/2, a/3**	**b/2, b/3**	**N/A**	**d/1, d/4**
Purification of prepared antibodies	**7&8**	**a/1, a/2, a/3**	**b/2, b/3, b/4**	**N/A**	**d/1, d/5, d/6**
Diagnostic applications of polyclonal /monoclonal antibodies	**9&10**	**a/1, a/2, a/4**	**b/2, b/3, b/4**	**N/A**	**d/1, d/4, d/5**
Therapeutic applications of polyclonal/monoclonal antibodies	**11&12**	**a/1, a/2, a/4**	**b/1, b/5**	**N/A**	**d/1, d/4, d/5**
New strategies in antibody production	**13&14**	**a/4, a/5**	**b/1, b/4, b/6**	**N/A**	**d/1, d/5, d/6**

Course coordinator: Ass. Prof. Dr. Roba Mohamed Talaat
Head of Department: **Prof.Dr. Ibrahim Helmy**