

A- Basic Information

Programme(s) on which the course is given:	MSc of Fish Biology & Aquatic Ecology
Department responsible for offering the course:	Zoology
Department responsible for teaching the course:	Zoology
Academic year:	2012-2013
Course title and code:	Molecular Genetics Z6634
Contact hours (credit hours):	Lecture: 2 hrs Practical: 2 hrs Total: 3 hrs
Course coordinator:	Prof. Dr. Sobhy Hassab Elnaby

B- Professional Information

The course aim and intended learning outcomes are based on that mentioned in the programme specifications, with more course-related specific details.

1- Overall Aims of Course: By the end of this course, the student should be able to

- * Realize the central dogma for molecular Biology.
- * Identify the structure of DNA, RNA and protein.
- * Analyze gene structure and regulation, as well as protein synthesis mechanisms.
- * Practice advanced techniques of molecular biology.

2- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

- a1- Outline the concepts of molecular biology.
- a2- Recognize the structure of DNA, RNA and protein.
- a3- Describe the gene structure, expression and regulation.
- a4- Define the main steps of protein synthesis.
- a5- List some advanced techniques applied in molecular biology.

b- Intellectual Skills:

- b1- Interpret the relationships between DNA, RNA and protein.
- b2- Explain the mechanisms of gene expression, transcription and translation.

- b3- Diagnose some diseases induced by mutations.
- b4- Identify DNA fingerprint and dynamic mutation.

c- Professional and Practical Skills:

- c1- Practice different molecular biology techniques.
- c2- Design and employ experiments in molecular biology lab within proper technical, scientific and ethical frameworks in animal handling and molecular biology.
- c3- Experiment the effect of different materials through animal injection under ethical codes for animal handling, and dissect for sampling tissues and organs.
- c4- Collect, preserve, store and handle samples and specimens for DNA and RNA processing.

d- General and Transferable Skills:

- d1- Improve writing skills through writing reports.
- d2- Discuss and present reports in seminars or group meetings.
- d3- Develop skills of teamwork in projects and assignments.
- d4- Locate computer-based databases and references about DNA, RNA and protein structure, synthesis and functions.
- d5- Study and find information independently and locate realistic solutions through right analysis and anticipation.

3- Course Contents

Topic	No. of hours	Tutorial/ Practical	Lecture
Relationship between physiology and molecular biology.	2	-	2
Central dogma of molecular biology.	2	-	2
DNA, RNA and protein structure.	4	2	2
DNA, RNA and protein expression.	4	2	2
Gene regulation, transcription and translation.	4	2	2
In vivo and in vitro transcription and translation.	4	2	2
PCR technique	4	2	2
DNA fingerprinting	2	-	2
Molecular diagnosis of diseases.	2	-	2

4- Teaching and Learning Methods

- Lectures.
- Research assignment.
- Case study.
- Interactive Presentation.
- Brain storming.
- Practical sessions.

5- Student Assessment Methods

- Written Exams.
- Reports presentation
- Interviews.
- Practical exam.
- Oral Presentations.

Assessment schedule

Assessment 1	Reports	A report/three weeks
Assessment 1	Report defense	A presentation/three weeks
Assessment 2	Mid-term exams	Week 7
Assessment 3	Oral Exam	Week 11
Assessment 3	Final term exams	Week 14

Weighting of assessments

Mid-term examination	20%
Final-term examination	60%
Practical examination	10%
Oral examination	5%
<u>Semester work</u>	<u>5%</u>
Total	100%

6- List of references

1. Essential Books (Text books):

- 1- Turner, P.C. (2005). Molecular Biology.
- 2- Tropp, B.E (2008). Molecular Biology. Genes to Proteins.
- 3- Clark, D.P. and Pazdernik, N.J. (2012). Molecular Biology: Understanding the genetic Revolution.

2. Recommended Books:

- 1- Walker, J.M. and Gingold, E.B. (1993). Molecular Biology and Biotechnology.
- 2- Birren, B. and Green, E.D. (1997). Genome Analysis: A Laboratory Manual.
- 3- Clark, D.P. and Russel, L.D. (1997). Molecular Biology: Made Simple and Fun.

- 4- Burton, Z.F. and Kaguni, J.M. (1997). Experiments in Molecular Biology: Biochemical Applications.

3. Periodicals, Websites, ...etc.

- 1- <http://www.sciencedirect.com>
- 2- <http://www.ncbi.nlm.nih.gov/pubmed>
- 3- Nucleotide database: <http://www.ncbi.nlm.nih.gov/nucleotide>
- 4- Protein database: <http://www.ncbi.nlm.nih.gov/protein>
- 5- Sanger institute genome database: www.sanger.ac.uk

7- Facilities required for teaching and learning

* Dark class room equipped with Data show device.

* Molecular biology lab equipped with

1. PCR cyclor
2. Electrophoresis units
3. Trans-illuminator
4. Incubator
5. Water path-shaker

* Computers with internet Access.

Course coordinator: Prof. Sobhy Hassab Elnaby

Head of Department: Prof. Saber Sakr

Date: 15/1/ 2013.