Course Specification

Programme on which the course is given: M.Sc. Zoology (Genetic engineering and molecular biology).
Major or Minor Element of Programme:
Department offering the progarmme: Zoology
Department offering the course: Zoology.
Academic Year/Level: 2012-2013
Date of Specification approval:2012

A- Basic Information

Title: *Molecular Biology* Code: *Z663*
Credit Hours: 3 Lecture: 2
Tutorial: 2 Practical: 2 Total: 3

B- Professional Information

1- Overall aims of the course: By the end of this course, the student will be able to:

1- Know and understand the central dogma for molecular biology.
2- Demonstrate the knowledge of basic concepts on DNA, RNA and protein.
3- Understand and analyze gene structure and regulation, as well as protein synthesis mechanisms.
4- Evaluate basic techniques of molecular biology.

2- Intended Learning Outcomes (ILOs):

a- Knowledge and Understanding:

a1- Understanding the central dogma of molecular biology.

a2- Know the main items of molecular biology like DNA, RNA, and protein.

a3- Describe the gene structure, expression, and regulation.

a4- Understanding the main steps of protein synthesis.

a5- Understanding the main techniques applied in molecular biology.

b- Intellectual Skills:

b1- Demonstarte the relationship between DNA, RNA, and protein.

b2- Discuss the mechanisms of gene expression, transcription, and translation.

b3- Dignosis of some diseases induced by mutations.

b4- Determination of DNA fingerprint and dynamic mutation.

c- Professional and Practical Skills:

c1- Use appropriate lab equipment and tools for molecualar biology lab.

c2- Design and perform experiments in the lab and field within proper technical, scientific and ethical frameworks in animal handling and molecular biology.

c3- Inject laboratory animals with different test materials, under the ethical codes for animal handling, and dissect for sampling tissues and organs.

c4- Collect, preserve, store, handle samples and specimeons for DNA and RNA processing.

d- General and Transferable Skills:

d1- Write reports for PCR results.

d2- Computer-based mining of databases and references about DNA, RNA, and protein structure, synthesis and functions.

d3- PowerPoint- based presentations for reports in seminars or group meetings.

d4- Work coherently and successfully as a part of team in projects and assignments.

d5- Study and find information independently, and finding realistic solutions through right analysis and anticipation.

3- 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 structure	4	2	2
Gene structure and expression	4	2	2
Gene structure and expression	4	2	2
Gene regulation, transcription and translation	4	2	2
Gene regulation, transcription and translation	4	2	2
In vivo and in vitro transcription and	4	2	2

translation			
PCR	4	2	2
PCR	4	2	2
DNA fingerprinting	2	-	2
Molecular diagnosis of diseases	2	-	2

4- Teaching and Learning Methods

4.1- Lectures
4.2- Oral presentations.
4.3- Research assignment.
4.4- Exams.

5- Student Assessment Methods

5.1- Reports to assess collection of course material.
5.2- Mid-term exam to assess mid-term performance.
5.3- Final exam to assess final term performance.

Assessment Schedule

Assessment 1: Reports	a report/ three weeks.
Assessment 2: Report defense	a presentation/ three weeks.
Assessment 3: Mid-Term	week 8 (Mid-Term week)
Assessment 4: Final term exam	week 15 -16 (final-Term week)

Weighing of Assessments

Mid-term examination:	20 %.
Final-term examination	40 %.
Oral examination	00%
Practical examination	20%
Semester work	20%
Other types of assessment	00%
Total	100%

6- List of references

6.1. Essential Books

- Molecular Biology. By: Philip C. Turner, 2005.
- Molecular Biology: Genes to Proteins. By: Burton E. Tropp, 2008.

- Molecular Biology: Understanding the Genetic Revolution. By: David P. Clark, Nanette J. Pazdernik, 2012.

6.2. Recommended Books:

- Molecular biology and biotechnology. By: John M. Walker, E. B. Gingold, 1993.
- Genome Analysis: A Laboratory Manual. By: Bruce Birren, Eric D. Green, 1997
- Molecular biology: made simple and fun. By: David P. Clark, Lonnie Dee Russell, 1997.
- Experiments in molecular biology: biochemical applications. By: Zachary F. Burton, Jon Masato Kaguni, 1997.

6.3. Periodicals, Websites, ….etc

- Google books: http://books.google.com/bkshp?hl=en&tab=wp
- http://www.sciencedirect.com/
- http://www.ncbi.nlm.nih.gov/pubmed/
- Nucleotide database: http://www.ncbi.nlm.nih.gov/nuccore
- Protein database: http://www.ncbi.nlm.nih.gov/protein
- 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: PCR cycler, electrophoresis units, trans-illuminator, incubator and water path-shaker.

Course coordinator: Prof. Sobhy Hassab El-naby

Head of Department. Prof. Saber Sakr