هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

# Course Specifications

| | |
|---|---|
| **Course Title:** | **Molecular Biology** |
| **Course Code:** | **2014104-3** |
| **Program:** | **Bachelor in Zoology** |
| **Department:** | **Biology Department** |
| **College:** | **College of Sciences** |
| **Institution:** | **Taif University** |

## Table of Contents

## A. Course Identification

| | |
|---|---|
| **1. Credit hours:** | 3 hr |
| **2. Course type** | |
| **a.** | University ☐ College ☐ Department √ Others ☐ |
| **b.** | Required √ Elective ☐ |
| **3. Level/year at which this course is offered:** | 10th level / 4th year |
| **4. Pre-requisites for this course** (if any)**:** | Genetics 2012201-2 |
| **5. Co-requisites for this course** (if any)**:** | None |

**6. Mode of Instruction** (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | **Traditional classroom** | 6 hr/Week | 100% |
| 2 | **Blended** | - | - |
| 3 | **E-learning** | - | - |
| 4 | **Distance learning** | - | - |
| 5 | **Other** | - | - |

**7. Contact Hours** (based on academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1 | **Lecture** | 30 |
| 2 | **Laboratory/Studio** | 30 |
| 3 | **Tutorial** | - |
| 4 | **Others** (specify) | - |
| | **Total** | 60 |

## B. Course Objectives and Learning Outcomes

**1. Course Description:**

This course deals with studying the composition and structure of nucleic acids, emphasizes the concept of the central dogma of molecular biology, by which, DNA replicates to form another molecules of DNA, and is transcribed to produce RNA. In turn, RNA is translated to form proteins, then, proteins exert the cellular functions stored in DNA.

**2. Course Main Objective:**

This course describes the central dogma of molecular biology which explains how cells promote growth, division and development. At the end of the course student will be able to demonstrate a clear understanding of the molecular mechanism of replication, transcription and translation.

**3. Course Learning Outcomes**

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge and Understanding:** | |
| 1.1 | Recognize facts, principles, scientific terminology and concepts across molecular biology. | K1 |
| 1.2 | Apply basic requirements and routine procedures used to investigate replication, transcription and translation in prokaryotes and eukaryotes. | K3 |

| CLOs | | Aligned PLOs |
|---|---|---|
| **2** | **Skills:** | |
| 2.1 | Analyze concepts of DNA replication and transcription. | S1 |
| 2.2 | Demonstrate the functions of nucleic acids in different biological systems. | S4 |
| **3** | **Values:** | |
| 3.1 | Conduct tasks based on convincing evidences with autonomy. | V2 |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1 | **Chapter 1:** Introduction to molecular biology<br>• The basic properties of cells,<br>• Overview of the central dogma of MB | 3L+3P |
| 2 | **Chapter 2:** Structure and function of nucleic acids (DNA and RNA)<br>• In prokaryotes<br>• In eukaryotes | 3L+3P |
| 3 | **Chapter 3:**<br>• Structure of genes in Prokaryotes & Eukaryotes<br>• Molecular mechanism of DNA replication and its enzymes in Prokaryotes & Eukaryotes | 6L+6P |
| 4 | **Chapter 4:** Molecular mechanism of transcription and its enzymes<br>• In prokaryotes<br>• In eukaryotes | 6L+6P |
| 5 | **Chapter 5:** Molecular mechanism of translation and its enzymes<br>• In prokaryotes<br>• In eukaryotes | 6L+6P |
| 6 | **Chapter 6:**<br>• Gene regulation at different levels<br>• Techniques of molecular biology | 6L+6P |
| **Total** | | 30L+30P |

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| **1.0** | **Knowledge and Understanding:** | | |
| 1.1 | Recognize facts, principles, scientific terminology and concepts across molecular biology. | Lectures<br>Interactive learning | Paper-based exams |
| 1.2 | Apply basic requirements and routine procedures used to investigate replication, transcription and translation in prokaryotes and eukaryotes. | Lectures<br>Interactive learning | Paper-based exams |
| **2.0** | **Skills:** | | |

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| 2.1 | Analyze concepts of DNA replication and transcription. | Open discussion<br>Problem solving | Paper-based exams<br>Practical exam |
| 2.2 | Demonstrate the functions of nucleic acids in different biological systems. | Small group activities<br>Open discussion | Practical reports |
| **3.0** | **Values:** | | |
| 3.1 | Conduct tasks based on convincing evidences with autonomy. | Small group activities<br>Interactive learning | Activities Evaluation |

### 2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|---|---|---|
| 1 | Assignments and activities:<br>1. Written Assignments<br>2. Home-work | Variable | 10 |
| 2 | Midterm Exam | 5th | 20 |
| 3 | Periodic Exam | 7th | 10 |
| 4 | Practical Reports | Continuous | 15 |
| 5 | Final Practical Exam | 11th | 5 |
| 6 | Final Written Exam | 12th | 40 |

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:**

6 hours per week (as defined in the teaching schedule of the faculty member) for academic advice and consultations.
Teaching staff is also available using Blackboard web site and Taif University "Edugate" System.

## F. Learning Resources and Facilities

### 1. Learning Resources

| | |
|---|---|
| **Required Textbooks** | - Robert Weaver (2012). Molecular Biology, 5th Edition, WCB/McGraw-Hill. |
| **Essential References Materials** | - Darnell, J., Lodish, H., Baltimore, D. (1990). Molecular Cell Biology, Scientific American Books, New York, USA. |
| **Electronic Materials** | Blackboard website<br>Website of Saudi digital Library |
| **Other Learning Materials** | Digital programs and professional software |

## 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation**<br>(Classrooms, laboratories, demonstration rooms/labs, etc.) | - Classrooms for 40 students\lecture.<br>- Molecular biology laboratory for 20 students\ lab activity. |
| **Technology Resources**<br>(AV, data show, Smart Board, software, etc.) | - Data show |
| **Other Resources**<br>(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | - Software tools of molecular biology |

## G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| Effectiveness of teaching and assessment | Students | Indirect |
| Quality of learning resources | Peer Reviewer<br>Students | Direct<br>Indirect |
| Extent of achieving the course learning outcomes | Peer Reviewer<br>Students | Direct<br>Indirect |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

| | |
|---|---|
| **Council / Committee** | **Biology Department** |
| **Reference No.** | **Committee number 14 - Academic Year 1442-1443H** |
| **Date** | **22\5\2022G – 21\10\1443H** |

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