



Course Specifications

| | |
|----------------------|--|
| Course Title: | Molecular Medicine 1 |
| Course Code: | MOL114 |
| Program: | Bachelor of Medicine, Bachelor of Surgery (MBBS) |
| Department: | NA |
| College: | College of Medicine |
| Institution: | Alfaisal University |

Table of Contents

| | |
|---|----------|
| A. Course Identification | 3 |
| 6. Mode of Instruction (mark all that apply) | 3 |
| B. Course Objectives and Learning Outcomes | 3 |
| 1. Course Description | 3 |
| 2. Course Main Objective..... | 3 |
| 3. Course Learning Outcomes | 4 |
| C. Course Content | 4 |
| D. Teaching and Assessment | 5 |
| 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods | 5 |
| 2. Assessment Tasks for Students | 5 |
| E. Student Academic Counseling and Support | 5 |
| F. Learning Resources and Facilities | 6 |
| 1. Learning Resources | 6 |
| 2. Facilities Required..... | 6 |
| G. Course Quality Evaluation | 7 |
| H. Specification Approval Data | 7 |

A. Course Identification

| |
|--|
| 1. Credit hours: 3 (2+2+0) |
| 2. Course type a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: Sem 1, Year 1 |
| 4. Pre-requisites for this course (if any): None |
| 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 | 30 | 77% |
| 2 | TBL, Labs | 9 | 23% |

7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1 | Lecture | 30 |
| 2 | Laboratory/Studio | |
| 3 | Tutorial | 9 |
| 4 | Others (specify) | |
| | Total | 39 |

B. Course Objectives and Learning Outcomes

1. Course Description

Molecular Medicine is designed to teach the principles of biochemical pathways, with an emphasis on normal regulation and changes during the pathogenesis of disease. As part of the Basic Medical Science component of the MBBS program importance is given to the integration of biochemistry with other medical sciences such as physiology, pathology, nutrition and most importantly clinical diagnosis of disease. Students are expected to study the metabolic pathways of the five major biochemical molecules, with significant weight given to the clinical correlations to disease and linking signs and symptoms to biochemical deficiencies.

2. Course Main Objective

To link basic principles in biochemistry and metabolism to physiology, pathology, pharmacology, clinical diagnosis and nutrition. Clinical correlations of each of the metabolic pathways are discussed.

3. Course Learning Outcomes

| CLOs | | Aligned PLOs |
|------|--|--------------|
| 1 | Knowledge and Understanding | |
| 1.1 | Compare and contrast the structure of nucleic acids and explain the process of gene expression with an emphasis on clinical correlations. | PLO2,23 |
| 1.2 | Describe the structure, classification, function, and properties of proteins and their building blocks. Relate protein structure to normal function and identify diseases related to abnormal protein structure. | PLO2 |
| 1.3 | Describe the structure, function, and classification of carbohydrates, and their derivatives such as glycoproteins and glycosaminoglycan. | PLO2 |
| 1.4 | Describe carbohydrates metabolism and its regulation. Describe reactive oxygen species as by-product of metabolism and relate their contribution to various diseases. | PLO2,23 |
| 1.5 | Describe the importance of vitamins and minerals in the regulation of metabolism. | PLO2,23 |
| 2 | Skills : | |
| 2.1 | Extract human genomic DNA and determine its concentration and purity. | PLO2 |
| 3 | Values: | |
| 3.1 | Adhere to the attendance policy. | |
| 3.2 | Maintain professional conduct with colleagues, faculty and staff. | |

C. Course Content

| No | List of Topics | Contact Hours |
|----|---|---------------|
| 1 | Introduction to Molecular Medicine | 2 |
| 2 | Nucleic Acid Structure | 1 |
| 3 | RNA Transcription | 2 |
| 4 | Amino Acids | 2 |
| 5 | Protein Structure | 2 |
| 6 | Protein Synthesis | 1 |
| 7 | Regulation of Gene Expression | 1 |
| 8 | Protein Trafficking | 1 |
| 9 | Globular Proteins | 1 |
| 10 | Fibrous Proteins | 2 |
| 11 | Carbohydrates | 1 |
| 12 | Glycosaminoglycan & Glycoproteins | 1 |
| 13 | Glycolysis | 2 |
| 14 | TCA Cycle | 1 |
| 15 | The Respiratory Chain and Oxidative Phosphorylation | 1 |
| 16 | Gluconeogenesis | 1 |
| 17 | Glycogen Metabolism | 2 |
| 18 | Pentose Phosphate Pathway | 1 |
| 19 | Alternative Pathway of Carbohydrates Metabolism | 1 |
| 20 | Alcohol Metabolism | 1 |
| 21 | Bioenergetics | 1 |
| 22 | Vitamins | 1 |
| 23 | Reactive Oxygen Species and Cellular Antioxidants | 1 |

| | | |
|--------------|-----------|----|
| 24 | TBL, Labs | 9 |
| Total | | 39 |

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 | Compare and contrast the structure of nucleic acids and explain the process of gene expression with an emphasis on clinical correlations. | Lectures, TBLs | Formative and summative assessments |
| 1.2 | Describe the structure, classification, function, and properties of proteins and their building blocks. Relate protein structure to normal function and identify diseases related to abnormal protein structure. | Lectures, TBLs | Formative and summative assessments |
| 1.3 | Describe the structure, function, and classification of carbohydrates, and their derivatives such as glycoproteins and glycosaminoglycan. | Lectures, TBLs | Formative and summative assessments |
| 1.4 | Describe carbohydrates metabolism and its regulation. Describe reactive oxygen species as by-product of metabolism and relate their contribution to various diseases. | Lectures, TBLs | Formative and summative assessments |
| 1.5 | Describe the importance of vitamins and minerals in the regulation of metabolism. | Lectures, TBLs | Formative and summative assessments |
| 2.0 | Skills | | |
| 2.1 | Extract human genomic DNA and determine its concentration and purity. | Lectures, Labs | Summative assessment |
| 3.0 | Values | | |
| 3.1 | Adhere to the attendance policy. | | Continuous assessment |
| 3.2 | Maintain professional conduct with colleagues, faculty and staff. | | Continuous assessment |

2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|----------|--------------------------------------|
| 1 | TBL | 4,8,12 | 5 |
| 2 | Midterm | 10 | 20 |
| 2 | Final Exam | 18 | 75 |

*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 :

The CoM program established its own mentorship program that employs all full-time faculty as mentors. Through this program, every medical student in the program is assigned a mentor at the beginning of their first semester of studies. The program has a broad scope covering academic advising and counseling. The mentors handle all aspects related to academic advising, including academic planning, academic performance review, and advice on course drop or withdrawal, study skills, and time management.

F. Learning Resources and Facilities

1. Learning Resources

| | |
|---------------------------------------|--|
| Required Textbooks | Lippincott's Illustrated Reviews: Biochemistry, 7th Edition, 2017 ISBN-13: 978-1496344496 ISBN-10: 1496344499 |
| Essential References Materials | <ol style="list-style-type: none"> 1. Harper's Illustrated Biochemistry: 28th edition by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2009. 2. Principles of Biochemistry, Donald J. Voet, Judith G. Voet, Charlotte W, pratt; Willey, 3rd edition; 2008 |
| Electronic Materials | PowerPoint presentations including suggested animations links uploaded on Alfaisal eLearning portal |
| Other Learning Materials | |

2. Facilities Required

| Item | Resources |
|--|---|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | Classrooms, Examination Facilities, laboratories |
| Technology Resources (AV, data show, Smart Board, software, etc.) | AV (Audio-Visual), Smartboard, Moodle (E-learning Management) |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | Nanodrop for DNA Quantification Centrifuges Thermomixer (Heating block) Vortex Micropipettes PCR machine Microplate reader Aspirators Safety cabinet Tissue culture incubator Inverted microscope Cell counter |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|--------------------------------------|------------|--------------------|
| Course and Faculty Evaluation Survey | Students | Survey |
| | | |
| | | |
| | | |
| | | |
| | | |

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 | |
| Reference No. | |
| Date | |