# Republic of Yemen

## Ministry of Higher Education & Scientific Research

## 21 SEPTEMBER UNIVERSITY of MEDICALS &

## APPLIEED SCIENCES

Faculty of Laboratory Medicine.

Department of Biochemistry and Molecular biology

Course Specification of Comparative Biochemistry
Course No. (03.11. 313)
**2022/2023**

| Prepared by: | Reviewed by: | Head of the Department: | Vice Dean for Quality affairs | Dean of College: |
|---|---|---|---|---|
| - Dr. Ebtesam Mahdi Al-Zabedi | Dr\ DrNawal Al-Henhena | DrNawal Al- Henhena | Dr\Gamil Taher Abdul Mughni | - Associate Prof. Dr. Ebtesam Al-Zabedi |

| I. Course Identification and General Information: | | | | | |
|---|---|---|---|---|---|
| 1 | **Course Title:** | Comparative Biochemistry | | | |
| 2 | **Course Code & Number:** | 03.11. 313 | | | |
| 3 | **Credit Hours:** | **Theory Hours** | | | |
| | | **Lecture** | **Exercise** | Practical | **Credit Hours** |
| | | 2 | 0 | 0 | 2 |
| 4 | **Study Level/ Semester at which this Course is offered:** | 1st Semester | | | |
| 5 | **Pre –Requisite (if any):** | None | | | |
| 6 | **Co –Requisite (if any):** | None | | | |
| 7 | **Program (s) in which the Course is Offered:** | Master degree of Clinical Biochemistry & Molecular Biology | | | |
| 8 | **Language of Teaching the Course:** | English | | | |
| 9 | **Study System:** | semester | | | |
| 10 | **Mode of Delivery:** | Lecture | | | |
| 11 | **Location of Teaching the Course:** | University Campus | | | |
| 12 | **Prepared by:** | Dr. Ebtesam Al- Zabedi | | | |
| 13 | **Date of Approval:** | 2023 | | | |

| | A. II. Course Description: |
|---|---|
| | This course provides an in-depth study of the major structure of plasma membrane, Carbohydrates lipid proteins ,types of transport across the membrane and membrane variations and pathology |

| III. Alignment Course Intended Learning Outcomes with program outcomes | | |
|---|---|---|
| **III. Course Intended Learning Outcomes (CILOs)** | | **Referenced PILOs** |
| **A. Knowledge and Understanding:** ***Upon successful completion of the course, students will be able to:*** | | |
| a1 | **Undestaand** the basic structure and function of plasma membrane, types of transport, electrochemical gradient of protons and ATP synthesis, genetic variation and genetic diseases, drugs that act on the membrane | **A1** |
| **B. Intellectual Skills:** ***Upon successful completion of the course, students will be able to:*** | | |
| b1 | **Explain** the mechanism of detoxification of lipid soluble substances | **B1** |
| **C. Professional and Practical Skills:** ***Upon successful completion of the course, students will be able to:*** | | |
| c1 | **Perform** diagnostic laboratory tests in clinical biochemistry and genetic molecular | **C1** |
| **D. Transferable Skills:** ***Upon successful completion of the course, students will be able to:*** | | |
| d1 | **Demonstrate** oral and written effective communication skills | **a1,a4,b1,b3,c2,d3** |

| C. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment methods: | | | |
|---|---|---|---|
| (A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies: | | | |
| | Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| A1 | **Undestaand** the basic structure and function of plasma membrane, types of transport, electrochemical gradient of protons and ATP synthesis, genetic variation and genetic diseases, drugs that act on the membrane | Lectures | Exams |
| A2 | **Discuss** the genetic variation and genetic diseases, drugs that act on the membrane | Lectures | Exams |
| (B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies: | | | |
| | Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| B1 | **Explain** the mechanism of detoxification of lipid soluble substances | Lectures | Exams, Assignments |
| B2 | **Describe the deferent types of toxins and venoms and their sources** | Lectures | Exams, Assignments, Lab reports |
| C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies: | | | |
| | Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| C1 C2 | **Perform** diagnostic laboratory tests in clinical biochemistry and genetic molecular | Lectures Practical sessions | Lab reports, Exams |
| (D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies: | | | |
| | Course Intended Learning Outcomes | Teaching strategies | Assessment Strategies |
| D1 | **Demonstrate** oral and written effective communication skills | | |

| | | | | | |
|---|---|---|---|---|---|
| | **III. Course Content:** | | | | |
| | **A – Theoretical Aspect:** | | | | |
| **Order** | **Units/Topics List** | **Sub Topics List** | **week** | **contact hours** | **Learning Outcomes** |
| **1** | **General structure and composition of plasma membrane** | Crbohydrates,lipid and protein ,mosaic model of structure, Cytoskelatole structures, Ion distribution,Electro-chemical gradientof protons,electron transport in mitochondrial membrane& ATP production | 5 | 10 | a1,a2,b1,b 2,c1,c2,d1 |
| **2** | **Lysosomes, secretion, exocytosis& endocytosis** | Protein trafficking mechanism,Processing and packaging of products Membrane interaction during exocytosis, Other mechanisms ..phagocytosis, pinocytosis, lysosomes | 4 | 8 | a1,a2,b1,b 2,c1,c2,d1 |
| **3** | **Membrane variation** | -Variable between membranes, genetic variability - Cell proliferation& differentiation, membrane fusion, Detoxification of heavy metals, lipid-soluble materials - Blood detoxificationby membrane - Venom's and toxins | 4 | 8 | a1,a2,b1,b 2,c1,c2,d1 |
| **4** | **membrane pathology** | Genetic diseases of membrane Laddle's syndrome, cystic fibrosis, thalasemia, transport defect, lysosomal storage diseases, erythrocyte disorders, spectrine and protein abnormalities, Duchene muscular dystrophyand other defects. | 3 | 6 | a1,a2,b1,b 2,c1,c2,d1 |
| **14** | Final exam | | | | |
| | **Number of Weeks /and Units Per Semester** | | **16** | **32** | |

| V. Teaching Strategies of the Course: | |
|---|---|
| 1- | Lectures |
| 2- | Seminars |
| | |

| VI. Assessment Methods of the Course: | |
|---|---|
| **No** | **Assignment** |
| 1 | **Written Exams ( Essays) and Quizzes** |
| 3 | Oral Exams |
| 5 | Student presentation |

**VII. Assignments:**

| No. | Assignments | Week Due | Mark | Proportion of Final Assessment | Aligned CILOs (symbols) |
|---|---|---|---|---|---|
| 2 | **Activity** | Throughout the semester | 20 | 20% | a2,a4.b1,b2,c1,c2,d3 |
| 5 | **Final Exam** | | 80 | 80% | a2,a4.b1,b2,c1,c2,d3 |
| **Total** | | | **100** | | |

## IX. Learning Resources:

· *Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).*

| | |
|---|---|
| **1- Required Textbook(s) ( maximum two ).** | |
| **1-** | Devlin-Textbook of Biochemistry with Clinical Correlations-John Wiley & Sons (2010) |
| **2-** | Harper's Illustrated Biochemistry 32 edition |
| **2- Essential References.** | |
| **1-** | Lehninger-Principles-of-Biochemistry fourth edition- David L. Nelson & Michael M.Cox |
| | Molecular Biology of the Cell: Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter, 2014,6 edition |
| **3- Electronic Materials and Web Sites *etc*.** | |
| **1-** | The National Center for Biotechnology Information (NCBI) – https://www.ncbi.nlm.nih.gov/ |
| **2-** | The Protein Data Bank (PDB) - https://www.rcsb.org/ |
| **3-** | The European Molecular Biology Laboratory (EMBL) - https://www.embl.org/ |
| **4** | The American Society for Biochemistry and Molecular Biology (ASBMB) - https://www.asbmb.org/ - |

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| **XI.** *Course Policies:* | |
|---|---|
| 1 | **Class Attendance:**<br>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes. |
| 2 | **Tardiness:**<br>-If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course |
| 3 | **Exam Attendance/Punctuality:**<br>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed. |
| 4 | **Assignments & Projects:**<br>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same. |
| 5 | **Cheating:**<br>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply. |
| 6 | **Forgery and Impersonation:**<br>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply. |
| 7 | **Other policies:**<br>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration |