**American University of Beirut**

**Faculty of Medicine**

**Department of Biochemistry and Molecular Genetics**

**Course Syllabus: (BIOC-255) – Biochemistry for Nursing**

**Semester: Spring**

**Course Director**

|  |  |
| --- | --- |
| Name: | Dr. Julnar Usta |
| Academic Title: | Professor |
| Department: | Biochemistry & Molecular Genetics |
| Faculty: | Medicine |
| Office Hours: | Appointment or before the lecture |
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**Course Details**

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| --- | --- |
| Course Number | *BIOC 255* |
| Course Title | *Biochemistry for Medical Lab Science Program Students* |
| Number of Credits | *3 cr* |
| Course Venue | *Med-1 class – DTS Building, Basement Floor, Med-1 Class Room* |
| Course Scheduled Days | *M, Tu, Wed* |
| Course Scheduled Timing | *Lectures: 2:00-2:50 Pm* |

**I. Course Description**

BIOC 255 is a 3-credit undergraduate introductory course of Biochemistry for Medical lab Technology students and related fields.

The course provides an overview of the structure, function, and metabolism of basic bio/macromolecule (lipids, proteins, carbohydrates). The course emphasizes clinical relevance correlating basic concepts to clinical situations.

**II. Course Learning Objectives / Outcomes**

**Course Objectives are to:**

(1) Allow students to understand and comprehend life in terms of molecular aspects and to

differentiate between the normal and abnormal.

(2) Provide basic knowledge of the structure, properties, fate and metabolic interconversions of

various bio-molecules (carbohydrate, lipid, protein), stressing control and regulatory

mechanisms.

(3) Introduce technical basics of biochemical methods that are used in detecting various

macromolecules.

**Upon completion of the course students must**:

* Relate structure of macromolecules (Proteins, Carbohydrates & Lipids) to properties and function.
* Describe the metabolic fate of amino-acids, Carbohydrates, and Lipids.
* Identify regulatory steps and mechanisms in various pathways.
* Identify the biochemical defect underlying a disease or clinical condition.

**III. Course Resources / References**

Students are responsible for information provided by: MOODLE uploaded handouts, power point presentations, explanation documents, and lectures in addition to any information brought up or discussed during the lecture hours.

The following is a recommended reference text book

Biochemistry

Lippincott’s Illustrated Reviews

Latest Edition

Pamela Champe, Richard Harvey, and Denis Ferrier.

**IV. Course Format**

The course format is blended combing both didactic lectures (Face to face) & (Voice Over Power Point) uploaded online on Moodle.

**V. Grading Criteria**

|  |  |
| --- | --- |
| **Learning Assessment Tool(s)** | **Percentage** |
| Exam -1 | 15% |
| Exam- 2 | 25% |
| Final Exam | 30% |
| Drop Quizzes | 10% |
| Class Participation, Attendance | 5% |
| Report | 15% |
| **Total** | **100%** |

**VI. Course Policies**

* Attendance is Mandatory
* MAKE UP for Missed Exams will be subjective
* No makeups for missed Drop Quizzes. Drop quizzes material may include previous lecture or material currently discussed in class
* The coordinator has the right to modify the schedule and topics as deemed necessary.
* **Exam schedules:**
  + **Exam -1 : Lectures 1-14**
  + **Exam -2 : Lectures 15-26**
  + **Final Exam : To be announced by the registrar’s office, Lectures 29-36**

**VII. University Rules and Regulations**

**Academic Integrity**

The heart of the academic profession is integrity. Any violation of academic integrity (cheating, plagiarism, dishonesty) will not be tolerated and will result in serious repercussions. Kindly refer to to AUB Policies and Procedures on academic integrity:

<http://pnp.aub.edu.lb/university/handbook/15801004.html>

**Learning Needs of Students with Disabilities**

AUB strives to make learning experiences accessible for all. If you have documented special needs and anticipate difficulties with the content or format of the course due to physical, or learning disability, you have to inform the Accessible Education Office. In order for you to receive the support needed and to facilitate the smooth accommodation process you must register with the Accessible Education office : [accessibility@aub.edu.lb](mailto:accessibility@aub.edu.lb); extension 3246, West Hall 314

**Non-Discrimination & Anti-Discriminatory harassment including sexual Harassment at AUB**

If you think you have experienced discrimination, discriminatory harassment, or sexual harassment, we encourage you to inform the equity /Title IX coordinator. Mitra Tauk at 01-350000, extension 2514, [titleix@aub.edu.lb](mailto:titleix@aub.edu.lb), report to a Title IX deputy at your faculty or at any other faculty ([www.aub.edu.lb/titleix](http://www.aub.edu.lb/titleix)) or report on line ([www.aub.ethicspoint.com](http://www.aub.ethicspoint.com). Reports must be submitted anonymously or not. Please know that the university will maintain the confidentiality of the complaint and privacy of the persons involved to the greatest extent possible, consistent with its goal of conducting a thorough and complete investigation and to the extent permitted by law.

**COURSE SCHEDULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lecture** | **Face to face Topic (2:00- 2:50) PM** | **lecture** | **VOP** |
| 1 | Introduction |  |  |
| 2 | Amino Acids |  |  |
| 3 | Amino Acids: Classes, Properties |  |  |
|  |  |  |  |
| 4 | Protein Properties |  |  |
| 5 | Protein Structures | 6,7 | Protein Purification |
| 8 | Protein Structures | 9 | Protein Sequencing |
|  |  |  |  |
| 10 | Discussion on purification, sequencing |  |  |
| 11 | Enzyme classes |  |  |
| 12 | Enzyme Kinetics |  |  |
|  |  |  |  |
| 13 | Enzyme Inhibition |  |  |
| 14 | Enzyme Regulation |  |  |
| 15 | Metabolism |  |  |
|  |  |  |  |
| 16 | EXAM-1 (Lectures 1-14) |  |  |
| 17 | TCA |  |  |
| 18 | TCA |  |  |
| 19 | Oxidative Phosphorylation | 20 | Carbohydrate Structure |
|  |  |  |  |
| 21 | Oxidative Phosphorylation | 22 | Carbohydrate Structure |
| 23 | Glycolysis |  |  |
| 24 | Glycolysis |  |  |
|  |  |  |  |
| 25 | Gluconeogenesis |  |  |
| 26 | Glycogen Metabolism |  |  |
| 27 | HMP | 28,29 | Lipids & Fatty acid |
|  |  |  |  |
| 30 | EXAM-2 (Lectures 15-28) |  |  |
| 31 | F.A Oxidation |  |  |
| 32 | F.A Oxidation; Ketone Bodies |  |  |
| 33 | Biosynthesis |  |  |
|  |  |  |  |
| 34 | A.A metabolism |  |  |
| 35 | A.A metabolism |  |  |
| 36 | Urea Cycle |  |  |
|  |  |  |  |
| 37 | A.A Catabolism |  |  |
| 38 | A.A Catabolism |  |  |
|  |  |  |  |
| 39 | Integration |  |  |

**Report topics**

* **Protein quantification**
* **Glucose determination: enzymatic and colorimetric**
* **Lipoproteins**
* **Isoelectric focusing**
* **Western blotting**
* **Dot blot analysis**
* **Thalassemia**
* **Creatinine biosynthesis and biological role**
* **Carnitine role in metabolism and related disorders**
* **Amino acidurias**
* **Hyperammonemia**
* **Glycogen storage diseases**
* **Hyperuricemia/gout**
* **Vitamin B6 deficiency**