Isfahan University of Medical Sciences

Course Plan

Course Title: Cellular and Molecular Biochemistry-Practical	
Degree: MBBS	**Course Code:**
Academic Year: 2020-21/ **Term:** 2	**Classroom Location:** General Biochemistry lab, Department of Clinical Biochemistry, School of Pharmacy, IUMS
Course credit: 0.4 unit	**Days & hours of Class Time:** Monday: 14:00 – 16:00 hrs
Course leader: Professor Pourfarzam	**Email:** pourfarzam@pharm.mui.ac.ir
Office Phone: 7045	**Office Address:** Department of Clinical Biochemistry, School of Pharmacy**,** IUMS

Introduction and main aims & objectives of the course:

Cellular and Molecular Biochemistry Laboratory is a practical course aimed to make students familiar with routine methods and tests which are used in a Biochemistry lab for the analysis of various biochemical components of plasma and urine in human health and disease. The aim is to: a) substantiate and illustrate theoretical concepts with experimental evidence, b) to study properties of basic biomolecules, c) to develop skills of performing basic biochemical tests important in clinical investigations, and d) to develop familiarity with basic biochemical laboratory techniques and instrumentations. These aims will be achieved by: 1) Practical bench work by students, 2) Demonstration by tutors of more complicated techniques, 3) Analyses of samples from known patients and unknown samples and interpretation of data, 4) Discussions on the practical with the help of clinical and scientific problem.

Specific Objectives:

At the end of this practical course, students will be able to:

- Be familiar with general rules in biochemistry lab, safety rules in laboratory, the 9 classes of hazardous materials classified by the UN, waste disposal in clinical laboratory, basic laboratory equipment and glassware. Select and adjust the most suitable micropipette to transfer a given volume, accurately transfer microliter volumes, evaluate & carry out Micropipette calibration, explain how experimental errors affect measurements. Prepare different solutions, explain the concept of Molarity, Normality, Osmolality, ppm, %w/v, etc.
- Explain the basis of chemical reactions and perform experiments to identify different carbohydrates.
- Explain the basis of chemical reactions and perform experiments to identify different amino acids and proteins.
- Explain the concept of chromatography, different chromatography techniques including column chromatography and planar chromatography, the principle of separation mechanisms in chromatography including, ion-exchange, partition, adsorption, size-exclusion, and affinity chromatography. Perform an

experiment to separate and identify amino acids in a sample using thin-layer chromatography (TLC) to detect diseases such as PKU or MSUD.

- Perform physical and chemical examination of urine and interpret the results. Physical examination including: volume, color, odor, appearance, and specific gravity, and chemical examination including: creatinine, ketone bodies, protein, nitrite, sugars, bile salts and pigments, pH, the presence of blood.
- Use a Photometer/spectrophotometer to measure light absorbance, identify and explain the function of different components of a spectrophotometer, perform experiments to verify Beer-Lambert law, evaluate wavelength accuracy of a spectrophotometer, and determine λmax of a given solution.

Time Table 2020-21_2 (1399-00_2) - Cellular & Molecular Biochemistry-Practical

Session	Title	Date
1	**Safety Rules in Laboratory, Laboratory Equipment and Glassware, Micropipette evaluation & Calibration, Preparation of Solutions**	Due to the limited no of student in each session, the date and time of sessions for each group is determined at the beginning of each term.
2	**Qualitative Analysis of Amino acids and Proteins**	
3	**Thin Layer Chromatography (TLC) Analysis of amino Acids**	
4	**Analysis of normal constituents of urine**	
5	**Photometry and Spectrophotometers: Principles of operation, Determination of λ_{max}, Wavelength accuracy**	

Evaluation and Exams	
Attendance, Discipline, and in-class evaluation	50%
Final Exam	50%

INFORMATION AND POLICIES

1. The Department of Biochemistry upholds and enforces the University's policies on, plagiarism and cheating. These policies are available from International student's office. All students are advised to read these policies.
2. Absences will be treated according to the university's vice-chancellor for education policies. Due to the compact nature of practical classes, no absences is allowed in practical classes.
3. Late arrival more than 5minutes is considered absence.

4. Mobile phones, Tablets, and other electronic devices must be turned off at all times unless being used for a purpose relevant to the class. Students having a Mobile phone, tablet, or computer on their person during an exam will be assumed to have it for the purpose of cheating.
5. Any recordings of lectures may only be performed with written permission of the lecturer, and are for personal use only. The instructor retains copyright to such recordings and all lecture materials provided for the class (electronic and otherwise); these materials must not be shared or reposted on the Internet.
6. Course materials, such as notes, problem sheets, examinations, example sheets, or review sheets, may not be redistributed without the explicit written permission of the instructor.