

Asahmed

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| Faculty: Allied Medical Sciences | |
| Department: Medical Laboratory Sciences (MLS) | |
| Program: MSc | |
| Academic year: 2022/2023 | Semester: First |



Course Plan

First: Course Information

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|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Course No. 0701701 | Course Title: Advanced Clinical Biochemistry | Credit Hours: 3 |
| Prerequisite: NA | Section No.:1 | Lecture Time: 4:30-7:30 pm Days: Monday |
| Type Of Course: | <input type="checkbox"/> Obligatory Faculty Requirement <input type="checkbox"/> Elective University Requirement <input type="checkbox"/> Obligatory University Requirement <input type="checkbox"/> Faculty Requirement <input type="checkbox"/> Course Elective Specialty Requirement <input checked="" type="checkbox"/> Obligatory Specialization requirement | |
| Type of Learning: | <input checked="" type="checkbox"/> Face-to-Face Learning <input type="checkbox"/> Blended Learning (2 Face-to-Face + 1 Asynchronous) <input type="checkbox"/> Online Learning (2 Synchronous+1 Asynchronous) | |

Second: Instructor's Information

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|------------------------------|-----------------------------------------------------------------------|------------------------------------|
| Name: Samir Awadallah | | Academic Rank: Professor |
| Office Number: 355 D | Telephone Ext: | Email: sawadallah@zu.edu.jo |
| Office Hours: | Monday: 10:00-12:00; 2:30-3:30 Wednesday: 9:30-12:00 | |

Third: Course Description

The course is designed to give in-depth understanding of recent developments in the field of clinical biochemistry. The learning strategies will include detailed examination and discussion of selected case studies and problem-solving scenarios. Selected topics related to disorders of carbohydrates, lipids, acid-base balance, kidney, cardiac, liver, and pancreas will be presented and extensively discussed. Topics related to geriatrics and paediatrics disorders, inborn errors of disease, therapeutic drug monitoring, toxicity of substances, and tumor markers will also be approached.

Fourth: Learning Source

| | | |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Main Reference: | Clinical Chemistry: Principles, Procedures, Correlations | |
| Author: Michael Bishop | Issue No.: 8th edition | Publication Year: 2018 |
| Additional Sources & Websites: | Textbooks: <ul style="list-style-type: none"> • Tietz Fundamentals of Clinical Chemistry. Burtis C.A., Ashwood E.R and Bruns D.E. Ed 6th ed. Saunders, 2012. • Clinical Chemistry: Theory, Analysis and Correlation. Kaplan, L.A. and Pesce, A.J., 5th ed. Mosby, 2010. Journals <ul style="list-style-type: none"> • Annals of Clinical Biochemistry • Clinical Biochemistry • Clinica Chimica Acta • Clinical Chemistry | |
| Teaching Type: | <input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input type="checkbox"/> MS Teams <input checked="" type="checkbox"/> Moodle | |

Fifth: Learning Outcomes

| Course Code* | Course Learning Outcomes (CLOs) | Connection To Program Learning Outcomes (PLOs)# |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Knowledge | | |
| K1 | Acquire a detailed knowledge of laboratory techniques, instrumentation, and recent advances employed in clinical laboratory and research centres. | P1,5,6 |
| K2 | Demonstrate knowledge in new trends in health care including molecular diagnostics, robotics, point of care, and self-testing. | P1,5,6 |
| K3 | Recognize standards and protocols related to pre-analytical, analytical, and post analytical aspects of sample collection and analysis. | P1,2,3 |
| K4 | Demonstrate full understanding of procedures and analytical techniques applied in TDM, toxicology, genetics, and inborn errors of metabolism. | P1,2 |
| K5 | Demonstrate full understanding of physiological and biochemical changes associated with clinical disorders or conditions presented and discussed in class. | P1,2,5,6 |

| Skills | | |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| S1 | Identify and assess the effectiveness of individual tests, strategies and protocols in the investigation and screening of diseases and pathological conditions | P1,2,5,6 |
| S2 | Interpret complex and advanced test results related to TDM, toxicology, genetic disorders, and inborne errors of disease. | P1,2 |
| S3 | Practice professional skills and scientific knowledge in quality management and quality assurance of clinical laboratory. | P3,5,6 |
| S4 | Apply essential set of skills needed to author technical reports, scientific manuscripts and monographs | P4,5,6 |
| Competencies | | |
| C1 | Ability to apply proper procedures and standards related to pre-analytical, analytical, and post analytical aspects of sample collection and analysis | P2,3 |
| C2 | Confidence in correlating laboratory findings with physiological and biochemical changes associated with disorders or conditions discussed in class. | P1,2,6 |
| C3 | Proficient in presenting and defending published research articles and/or data of case studies in front of students and faculty | P3,5,6 |
| C4 | Conducting literature search, reviewing, and criticizing published scientific articles | P4,5,6 |
| C5 | Demonstrate an awareness of the need for continuing education in terms of professional growth and development | P5,6 |

#P: Program PLOs, *Codes for CLOs: K: knowledge; S: skills; C: competencies.

Sixth: Course Structure

Teaching and learning Methods and strategies

The teaching and learning methods and strategy is a mixture of lectures, problem-solving, case discussions, and oral presentations. While the format of lectures is conventional; informal interaction is encouraged. Case discussions relevant to selected topics, will be covered in the teaching sessions and will involve extensive student participation. Assignments require students to present and review journal articles. Skills and ability to present journal articles are developed through class discussion.

The table below illustrate topics to be covered in this course with corresponding ILOs

| Week | Topic | ILOs | Teaching/Learning Method | Assessment Method/Tool | Reading Material |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1 | Laboratory calculations: Review Dilutions, concentrations (Molarity and Normality), % solutions, density calculations, anion gap, acid-base, and enzyme activity. | K1,3 C1 S3 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study (discussion & presentations) | Book chapter(s) & Topics to be assigned by instructor. |
| 2-3 | Method Evaluation and Quality Assurance: Review Specimen Collection, Processing, Preanalytical Variables, Analytical and Clinical Evaluation of methods, (Sensitivity, specificity, ROC curves, etc.), and Basic Statistical methods. | K1,3 C1 S3 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 4 | Advanced Analytical Techniques and instrumentations: chemiluminescence, Electrochemistry, electrophoresis, immunological, chromatographic, mass spectrometric, and molecular techniques | K1,2,4 C1 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 5 | Case study/problem-solving scenario: Presentation and discussion | K1,2,3,5 S3 C1 | Case study presentation Group discussion Oral presentations | Exams, quizzes Class participation Assignments Case study discussion & presentations | topics to be assigned by instructor |
| 6 | Advanced Topics: Therapeutic Drug Monitoring (TDM) | K4 S2 C2 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 7 | Case study/problem-solving scenario (TDM): Presentation and discussion | K4,5 S1,2 C2 | Case study presentation Group discussion Oral presentations | Exams, quizzes Class participation Assignments Case study discussion & | topics to be assigned by instructor |

| | | | | | |
|-------|--------------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------|
| | | | | presentations | |
| | Midterm Exam (proposed) | | | | TBA |
| 8 | Advanced Topics: Toxicology and Trace elements | K4 S1,2 C2 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 9 | Case study/problem-solving scenario: Presentation and discussion | K4,5 S1,2,4 C2,3 | Case study presentation Group discussion Oral presentations | Exams, quizzes Class participation Assignments Case study discussion & presentations | topics to be assigned by instructor |
| 10 | Diagnostic Molecular Biology: Genetic defects and inborn errors of metabolism | K2,4 S1,2 C2 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 11 | Case study/problem-solving scenario: Presentation and discussion | K2,4,5 S1,2,4 C2,3,5 | Case study presentation Group discussion Oral presentations | Exams, quizzes Class participation Assignments Case study discussion & presentations | topics to be assigned by instructor |
| 12 | Clinical Chemistry at the extremes: Pediatric and geriatric patients. | K4 S2 C2 | Lectures (PPT) Group discussion Homework Assignments | Exams, quizzes Class participation Assignments Case study discussion & presentations | Book chapter(s) & Topics to be assigned by instructor. |
| 13 | Case study/problem-solving scenario: Presentation and discussion | K2,4,5 S1,2,4 C2,3 | Case study presentation Group discussion Oral presentations | Exams, quizzes Class participation Assignments Case study discussion & presentations | topics to be assigned by instructor |
| 14-15 | Oral presentations of scientific topics by students | S4 C3,4,5 | Oral presentations and discussion by students | Case study discussion & presentations | TBA |
| 16 | Final Exam | | | | |

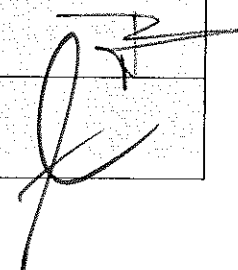
Seventh: Assessment methods

Summative assessment is through a combination of written examinations, class participation and discussion, marked assignments, and oral presentations in front of class.

| Methods | Online Learning | Blended Learning | Face-To-Face Learning | Measurable Course (ILOs) |
|-----------------------|-----------------|------------------|-----------------------|--------------------------|
| First Exam | 0 | 0 | 0 | |
| Second Exam | 0 | 0 | 0 | |
| Mid-term Exam | 0 | 0 | 30 | K1-5; S1-3; C1-2 |
| Participation/Quizzes | 0 | 0 | 10 | All |
| Oral Presentations | 0 | 0 | 20 | S4, C3,4,5 |
| Final Exam | 0 | 0 | 40 | All |

Eighth: Course Policies

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
 - a. Punctuality.
 - b. Participation and interaction.
 - c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

| Approved by: | Name | Date | Signature |
|--------------------|---------------|------------|---------------------------------------------------------------------------------------|
| Head of Department | د. لوسى عمارى | 13/10/2022 |  |
| Faculty Dean | Dr. Hayat | 10.13.2022 | |