جامعة أم القرى

كلية الطـــب

الماجستير في الكيمياء الحيوية السريرية

4. Learning and Teaching

4/1 Learning Outcomes and Graduate Specifications

4/1/1 Main tracks or specializations covered by the program:

(a) Clinical Biochemistry

4/1/2 Curriculum Study Plan Table

Level	Course Code	Course Title	Compulsory / Elective	Prerequisite Courses	Credit Hours
Level 1	1001601-4MBIO	Medical Biochemistry	Compulsory		4
	1001601-2ATQC	Analytical Techniques & Quality Control	Compulsory		2
	1001601-2BRS	Biomedical research & Biostatistics	Compulsory		2
Level 2	1001601-2MPD	Molecular Pathogenesis & Diagnostics	Compulsory		2
	1001601-3CBIO	Core Clinical Biochemistry	Compulsory		3
	1001601-2El1	Elective 1	Elective		2
Level 3	1001601-3SBIO	Specialized Clinical Biochemistry	Compulsory		3
	1001601-2DMT	Drug Monitoring & Toxicology	Compulsory		2
	1001601-2El2	Elective 2	Elective		2
Level 4	1001601-4HLT	Hospital Laboratory Training	Compulsory		4
	1001601-8THE	Thesis	Compulsory		8
Elective Courses	1001601-2El1 1001601-2El2	Bioinformatics in Medicine	Elective		2
		Laboratory Management	Elective		2
		Cancer Biomarkers	Elective		2
		Biomarkers in Inflammatory Diseases	Elective		2
		Clinical Nutrition	Elective		2
		Point of Care Testing	Elective		2
		Biochemical and Clinical aspects of Muscle Exercise	Elective		2
		Bio-neurochemistry in Medical Laboratory	Elective		2
		* These are examples of elective courses; **More courses for example Immunology chemistry Diseases of major organs will be added through implementation of the program**.			

4/1/4. Course Specification:

COURSE SPECIFICATIONS

Form

Course Title: **Medical Biochemistry**

Course Code: **1001601-4MBIO**

Date: 22/10/2018	**Institution:** Umm Al Qura University
College: Faculty of Medicine	**Department:** Biochemistry.

A. Course Identification and General Information

1. Course title and code: **Medical Biochemistry (1001601-4MBIO)**		
2. Credit hours: **(4)**		
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)		
4.Name of faculty member responsible for the course: **Prof. Wesam Nasif & Dr. Amr Amin & Dr. Afnan Jan**		
5. Level/year at which this course is offered: **Postgraduate**		
6. Pre-requisites for this course (if any): ---		
7. Co-requisites for this course (if any): ----		
8. Location if not on main campus:		
9. Mode of Instruction (mark all that apply):		
a. Traditional classroom	√	percentage? 60
b. Blended (traditional and online)		percentage?
c. E-learning	√	percentage? 20
d. Correspondence		percentage?
f. Other (Seminar, practical percentage?	√	20
Comments:		

B- Objectives

1. The main objective of this course

To produce graduates with an advanced integrated knowledge and understanding of core topics in medical biochemical with general principles that will enable graduates to use that biochemical knowledge to define the normal and abnormal cellular processes.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Addition and updates of more clinically applied sub-topics to the syllabus.
- Continuous staff development-programmers especially for new methods of teaching like e-learning, interactive teaching and stimulate self-learning.
- Regular departmental meeting to revise the contents of topics to ensure the relevancy and up to date contents of the course.
- More attention to the evaluation of student –presentation seminars as a good indicator for both regular revision of the contents delivered and the teaching methods.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course is of one semester duration and provides core topics in medical biochemistry enabling the Students to gain both skills and knowledge of theory and practice that enable them to perform as professionals capable of making important contributions in the field of medical biochemistry to further enhance students' knowledge of clinical biochemistry.

Furthermore, the course presents an overview of the fundamental principles of elementary medical biochemistry and will discuss specific topics relevant to the disciplines of medical and laboratory medicine.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Carbohydrate Metabolism and Clinical Correlations **Major pathways**: • Glycolysis, TCA cycle, Respiratory chain, Glycogen metabolism, Gluconeogenesis. • Hormonal regulation and glucose homeostasis, • Clinical correlations	2	6
Lipid Metabolism and clinical correlations: • FA biosynthesis, Oxidation, lipogenesis. • Ketone body metabolism, ketosis, and ketoacidosis. • Bile metabolism, bilirubin metabolism, • Cholesterol metabolism ; Hypercholestrelemia	1	4

Lipoproteins metabolism and clinical correlations: • Classification, plasma LP metabolism • Clinical utility of lipid profile and (dyslipoproteinemias, fatty liver, and Atherosclerosis).	1	2
Protein and Amino acids metabolism and clinical correlations: • Amino acids classification, Metabolism, and correlated disorders • Protein/Nitrogen balance, protein turn over, Obesity and protein energy malnutrition (PEM). Inborn errors of metabolism • Diagnostic utility of protein assessment.	2	8
Metabolic integration and interrelationship in different tissues and physiological conditions • Integrated tissue metabolism, patern of fuel utilization of brain, heart, muscle and liver • Well-fed state, starvation Pattern of fuel utilization during stress and muscle exercise.	1	2
Hemoglobin: molecular structure and clinical correlations • Structure, function, normal and abnormal types, and clinical disorders (structural and biosynthetic)	1	4
Enzymes and correlated clinical significance • Structure, nomenclature, biological function, mechanism of action, Inhibition, • Diagnostic applications of isoenzymes and enzymes on different tissues (liver, heart, pancreas, gall bladder, bones, muscles)	1	4
Vitamins: Structure, classification, functions, and clinical significance • Fat soluble vitamins • Water Soluble vitamins	1	4
Oxidative stress and Antioxidant	1	3
Essential trace elements in health and disease: • Biological Classification of Trace Elements, • Essential trace elements • Trace elements in human enzyme system. • Clinical Significance of Trace Elements	1	3
Body Fluids and Electrolyte balance: • Osmotic and oncotic pressure, fluids compositions, disturbances of fluids homeostasis, water deficit, dehydration, overhydration, electrolytes imbalance**.** • Electrolytes balance regulation	1	4
Arterial Blood Gas (ABG): • Test analysis and precautions • Normal values • Interpretation	1	4

Hormones: structure, classification, action, signal transduction, and correlated disorders • Classification, cell signalling, hormone action • Hypothalamic and Pituitary Hormones • Thyroid and Para-thyroid hormones • Infertility hormones	2	8

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	30	--	--	12	12	56
	Actual						
Credit	Planned	2			1	1	4CU
	Actual						

3. Individual study/learning hours expected for students per week. (4)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize biochemistry, and metabolism of carbohydrates, lipids, proteins, minerals and trace elements. Describe and understand the structure of enzymes, their properties and mechanism of action. Define and classify vitamins; point out the biochemical functions of each vitamin. Describe the Endocrine regulation of energy mobilization, metabolism and reproduction	•Lectures •Laboratory •Interactive Lecture	•Formative assessment •Periodic MCQ •Assignments Case scenarios
1.2	List the key reactions and intracellular metabolic pathways.	•Lectures •Laboratory •Interactive Lecture	•Formative assessment •Periodic MCQ

	Critically discuss and evaluate concepts and applications of Clinical Biochemistry.		
2.0	**Cognitive Skills**		
2.1	Predict (to reasonable extent) the results of clinical chemistry panels.	• Interactive Lecture	• Periodic exams
	Interpret the biochemical and cellular events underlying diseases	• Interactive Lecture	• Periodic exams
2.2	Describe regulatory mechanisms and integration of metabolic pathway. Correlate Biochemical defects in pathogenesis of diseases	• Interactive Lecture	• Periodic exams
	Interpret symptoms, signs and biochemical laboratory findings of some metabolic disorders.	• Problem based learning	• Assignments Case scenarios
3.0	**Interpersonal Skills & Responsibility**		
3.1	illustrate health and disease in an integrated theme considering cellular behavior and expecting the possible treatment procedures.	• Group activity	• Oral presentation seminars
3.2	work effectively with a group as a leader or member, to produce team seminars	• Group activity	• Oral presentation seminars
3.3	Demonstrate problem-solving skills for clinical case scenarios by interpreting data, designing and carrying out projects and experimental work, and making professional use of others where appropriate.	• Group activity	• Oral presentation seminars
4.0	**Communication, Information Technology, Numerical**		
4.1	Successfully utilize a range of information sources including information technology / health informatics in the form of search required assignments	• Case based learning	• Oral presentation seminars about subject related to the course in groups. • Research activities
4.2	Revise the different concepts of medical Biochemistry and report it in a clear, concise, and effective manner.	• Task Based Learning	• Oral presentation seminars about subject related to the course in groups. • Research activities

5.0	**Psychomotor (if any)**		
5.1	The psychomotor skills are mainly related to the practical classes such as: Accurate pipetting Mastering the operation of the lab machines Dealing with and taking care of the laboratory reagents	•Lab experiments.	•Practical exam

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)		**Week Due**	**Proportion of Total Assessment**
1	Interactive activities at lectures		10%
2	Completion of required group activity		30%
3	Completion of the assignments		30%
4	Oral presentation		20%
5	Satisfactory performance/demonstration of learning objectives		10%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The lecturers involved in the course to be available for student consultations and academic advice.
- Course organizer and lecturers of the course are happy to answer all students' quires during or after the lectures, and they can be reached by personal meeting, phones or e-mails.
- Student representative usually have the mobile number of the lecturer to contact him in case of any queries.
- All students have the e-mail of the lecturer.

E Learning Resources

1. List Required Textbooks
   - **Text book of Biochemistry with Clinical Correlations** seventh Ed, Devlin TM (2012) Ed.Wiley -Liss New York
   - **Harper's Illustrated Biochemistry,** Thirty one edition (2018)**.**
2. List Essential References Materials (Journals, Reports, etc.)
   Wills' Biochemical Basis of Medicine 3rd Ed (1997) Gillham B., Papachristodoulou D.K., Thomas J.H.,
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - *Clinical Biochemistry*, Official Journal of the Canadian Society of Clinical Chemists http://www.elsevier.com/locate/clinbiochem
   - The *Biochemical Journal.* http://www.biochemj.org/bj/about.htm
   - *Wiley Online Library*: http://onlinelibrary.wiley.com/journal
   - Medical Biochemistry page. http://themedicalbiochemistrypage.org/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Faculty of Medicine Classroom
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show, Smart Board, software
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Laboratory equipment including, Full automated clinical-chemistry analyzer, ELISA system, spectrophotometer, microscope.

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports.
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard curve
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice

Name of Course Instructor: Prof. Wesam Nasif & Dr. Amr Amin & Dr. Afnan Jan

Signature: **Date Completed: 22/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Analytical Techniques & Quality Control

Course Code: 1001601-2ATQC

Date: 20/10/2018	**Institution** Umm Al Qura University
College: Faculty of Medicine	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: A**nalytical Techniques and Quality Control (1001601-2ATQC)**
2. Credit hours: **(2)**
3. Program(s) in which the course is offered: Clinical Biochemistry Master Degree
   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course:
   Dr. Sameer Fatani & Dr. Mahmoud El-Readi
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Graduate degree from appropriate and recognized college of applied medical sciences or pharmacy or medicine or equivalent.
7. Co-requisites for this course (if any):
   A. The student should have overall grade “Good” in bachelor and “very good” in Biochemistry courses in undergraduate study.
   B. Evidence of English exam satisfaction
8. Location if not on main campus: Biochemistry Departments
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	50
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	10
d. Correspondence		percentage?	
f. Other Practical	√	percentage?	30

B- Objectives

The main objective of this course:

The overall objective of this course of the master degree is the student becomes a competent analyst with awareness of a wide range of the most common analytical biochemical techniques, quality control, and safety as well as their performance, comparative usefulness, limitations, and applications.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

1) Clinical biochemistry Methodology seminars.
2) Real cases and QC reports from hospitals and verification review of a process/method and write an official report.
3) Activation of self-learning through assignments and activities as case presentation and discussion of case scenarios.
4) Research project for selected up-to-date topics that recently apply in clinical biochemistry and not covered in the course
5) Updating of contents is a continuous process for the course.
6) Group assignments: Learning project for selected up-to-date techniques that recently apply in clinical laboratories
7) They will deal with electronic books in the field, as they are using now many web-based reference material.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The student of this course is expected to become familiar with most common techniques in Clinical Biochemistry. Gain the knowledge of their principle and purpose of utilization. The students getting essential background of how to review and read daily, weekly, and monthly quality control reports and how to take decision for accepting or rejecting patient results. In addition, the students should have the ability to troubleshoot QC outliers and laboratory documentation to make sure he/she has adequate knowledge and problem-solving skills. This course also, focuses on explain the laboratory safety guidelines and standard precautions in dealing with pathogens, chemical spills, and others in clinical laboratory environment.

The specific objectives of this course to:

1. Demonstrate usefulness and limitations of commonly used methods in Clinical Biochemistry and be able to detect errors and their sources in biochemical assays that used in the laboratory practice.
2. Describe the main instruments and techniques, which should be available in clinical biochemistry laboratory.
3. Recognize the technology and design of analyzers used in Clinical Biochemistry together with their applications and limitations.
4. Develop experience in how make new test validation i.e. comparison, precision, linearity, sensitivity and specificity.
5. Learn the criteria of test validation (accept or reject).

6. Understands the principles of quality assurance, quality control, and quality improvement and their application.
7. Understand the essential background of how to review quality control reports and the criteria for acceptability of patient results.
8. Recognize the troubleshoot QC results outside the acceptable limits and adequate knowledge and skills of the problems solving.
9. Understands and demonstrates the role of all necessary safety precautions in dealing with dangerous materials in clinical laboratory environments.
10. Explain the available IT facilities for result reporting and technical alerts.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
1. Basic Laboratory Techniques and Centrifugation: - Biological specimen collection, handling, and sample storage - Identification of common spectral interference - Methods of standardization and calibration	1	4
2. Photometric Methods - Spectrophotometry components and types (visible/UV/reflectance) - Creating a concentration (calibration) curve - Common clinical biochemistry spectrophotometric reactions	1	4
3. Analysis with Electrometric Methods - Ion selective electrodes (Na+, K+, Cl-, pH, pO2, and pCO2, electrodes) - Polarographic oxygen electrodes, e.g., glucose, other - ISEs, e.g., Ca2+, NH4+, Mg2+, Li+	1	3
4. Enzymology and Radioisotope Counting - Fixed interval assays, kinetic assays - Isoenzyme fractionation/quantitation - β and γ counting systems	1	3
5. Immunoassay Techniques - Types of immunoassay, Immunoelectrophoresis, Immunofixation, and Immunodiffusion - Enzyme-Labeled immunoassay, Fluorescence-Labeled immunoassay, Chemiluminescent-labeled immunoassay	1	4
6. Automated Instrumentation - Random access analyzers - Immunoassay analyzers - Total laboratory automation	1	2
7. Electrophoretic and Chromatographic Techniques - Principles of electrophoresis, support media; - Automated electrophoresis systems - Gas chromatography, GC-MS and LC-MS, HPLC	2	8
8. Solid/Dry Phase Chemistry and Point of Care Testing/STAT Systems - Dipstick technology - Thin film technology - Glucometers, blood gas testing, and cardiac markers	1	3
9. Quality Assurance and assessment - Quality assessment and quality control methods	4	4

- Pre-analytical, analytical, and post-analytical variables and errors - Systematic, random errors, and method evaluation - Internal and external quality control programs - Test validation. - Laboratory accreditation systems							
10. Lab Safety - Individual and collective responsibility - Handling of potentially infectious samples					1		3
11. Patient to Report and Laboratory Data Processing and Computing - Use of computers for data collection, processing, and as management tools					1		2
2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**		**Total**
Contact Hours	Planned	20	10	--	10		40
	Actual						
Credit	Planned	1	0.5		0.5		2 CU
	Actual						
3. Individual study/learning hours expected for students per week. (2)							
4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies							
Curriculum Map							
Code #	**NQF Learning Domains And Course Learning Outcomes**				**Course Teaching Strategies**		**Course Assessment Methods**
1.0	**Knowledge**						
1.1	Describe the main instruments and techniques, which should be available in clinical biochemistry laboratory.				Interactive Lecture		Assignments Case scenarios Methods Seminar
1.2	Learn the criteria of test validation (accept or reject).				Interactive Lecture		Assignments Case scenarios
2.0	**Cognitive Skills**						
2.1	Recognize the technology and design of analyzers used in Clinical Biochemistry together with their applications and limitations.				Interactive Lecture		Assignments Case scenarios
2.2	Understands the principles of quality assurance, quality control, and quality improvement and their application.				Interactive Lecture		Assignments Case scenarios
2.3	Understand the essential background of how to review quality control reports and the criteria for acceptability of patient results.				Interactive Lecture		Assignments Case scenarios
3.0	**Interpersonal Skills & Responsibility**						

3.1	Recognize the troubleshoot QC results outside the acceptable limits and adequate knowledge and skills of the problems solving.	IL Case scenarios	Oral presentation seminars
3.2	Understands and demonstrates the role of all necessary safety precautions in dealing with dangerous materials in clinical laboratory environments.	Interactive Lecture	Assignments Case scenarios
3.3	Develop experience in how make new test validation i.e. comparison, precision, linearity, sensitivity and specificity	IL Case scenarios	Assignments Case scenarios Learning project
4.0	**Communication, Information Technology, Numerical**		
4.1	Explain the available IT facilities for result reporting and technical alerts.	Task Based Learning	Oral presentation seminars Research activity
5.0	**Psychomotor(if any)**		
5.1	Demonstrate competency in the principles, usefulness and limitations of commonly used methods in Clinical Biochemistry and be able to detect errors and their sources in biochemical assays that used in the laboratory practice.	- IL - Practical - Problem based learning (PBL). - Case scenarios	Methods seminar Written exam practical exams.

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	satisfactory performance/demonstration of learning objectives		15%
2	Completion of case-based assignments		10%
3	Completion of the project		10%
4	Oral presentation		10%
5	Practical exam		15%
6	Written exam		40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The teaching staffs involved in the course are available for student consultations and academic advice at the assigned office hours of each staff member.
- Course organizer and teaching staffs of this course are happy to answer all students' quires during and after the teaching activities.

- The student leader usually has the mobile number of the teaching staffs and allows contacting him in case of any queries. - All students have the all available contact information of teaching staffs.

E Learning Resources

1. List Required Textbooks • Rogić, Dunja. "Wendy Arneson, Jean Brickell: Clinical Chemistry - A Laboratory Perspective." Biochemia Medica 18, no. 1 (2008): 123-124. https://hrcak.srce.hr/20215 • **Kumar**, Vijay, **Gill**, Kiran Dip: Basic Concepts in Clinical Biochemistry: A Practical Guide. springer 2018. • Kaplan L.A. , Pesce A.J. , and Kazmierczak S.C. Clinical Chemistry: Theory, Analysis, Correlation. Mosby. 2003, 1179 pp. • K. Wilson, J. M. Walker, Eds., *Principles and techniques of biochemistry and molecular biology* (Cambridge University Press, Cambridge, UK : New York, 7th ed., 2009). • R. F. Boyer, *Biochemistry laboratory: modern theory and techniques* (Prentice Hall, Boston, 2nd ed., 2012). • R. Katoch, *Analytical techniques in biochemistry and molecular biology* (Springer, New York, 2011).
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. - http://www.acb.org.uk/ - http://www.protocol-online.org/
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Faculty of Medicine Classroom, Biochemistry and Genetic Departments labs, Al-Noor hospital lab (Visit), Faculty of pharmacy Labs (Visit)
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show, Smart Board, software
1. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) - Spectrophotometer - GC-MS - LC-MS - RT-PCR, PCR Machine - Sequencer - WB facilities and machines

G Course Evaluation and Improvement Procedures

2. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

• University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports.
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies • Put and flow the up to date strategies to develop the course
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard methods of evaluation • Assigned exam committee form Biochemistry department to check control the double check of all exam and results process • Assigned staff member reviewers for students projects and activities not involved in the teaching the topic of activities.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice • Feedback from teaching staffs who's involved in the teaching process and taking in consideration their suggestions to develop this course.

Name of Course Instructor: Dr. Sameer Fatani & Dr. Mahmoud El-Readi

Signature: **Date Completed: 20/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Biomedical Research & Biostatistics

Course Code: 1001601-2RBS

Date: 22/10/2018	**Institution: Umm Al Qura University**
College: Medicine	**Department: Biochemistry**

A. Course Identification and General Information

1. Course title and code: **Biomedical Research and Biostatistics (1001601-2RBS)**
2. Credit hours: 2
3. Program(s) in which the course is offered. MSc Clinical Biochemistry
4. Name of faculty member responsible for the course:
   Dr. Saleh Ahmed & Dr. Riyad Almaimani
5. Level/year at which this course is offered: Post graduate
6. Pre-requisites for this course (if any): --
7. Co-requisites for this course (if any): --
8. Location if not on main campus: --
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	60%
b. Blended (traditional and online)	√	percentage?	20%
c. E-learning		percentage?	
d. Correspondence		percentage?	
e. Other (Seminars, Task Base Learning)	√	percentage?	20%

B- Objectives

1. The main objective of this course

The main objective of this course is to develop a research orientation among the students and to acquaint them with fundamentals of research methods through the following points:

- Understand the basic biostatistical methods used in biomedical research
- Understand the basic epidemiologic study designs that are used to test hypotheses, identify associations, and establish causation
- Select and apply methods of data summary and presentation
- Describe key statistical principles including probability, and distributions
- Understand the concepts of measurement of test performance and be able to apply the concepts of testing and screening in different settings.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The tutorials will be introduced as a small group discussion to develop critical thinking skills either in the critical analysis and interpretation of results.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is intended to present the fundamentals of biostatistics, featuring data production and data analysis. The students examine and be practically exposed to the main components of a research framework i.e., problem definition, research design, data collection, ethical issues in research, report writing, and presentation. Once equipped with this knowledge, students would be well-placed to conduct disciplined research under supervision in an area of their choosing. In addition to their application in an academic setting.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
- Introduction to biomedical research	1	2
- Principles of scientific thinking - Concepts of biostatistics and data analysis	1	2
- Ethics in biomedical research	1	2
- Role of Biostatistics in research - Population and sample	1	2
- Measures of Disease Frequency	1	3
- Variables and data - Types of variables - Organizing Qualitative and Quantitative Data	1	3
- Diagnostic & Screening Tests	1	3
- Research Designs	1	2

- Data presentation - Normal distribution curve - Testing research hypothesis	2	4
- Use of statistical software	1	2
- Search engines and online library	1	2
- Read and write a research paper - Critical appraisal of research paper	2	3

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	10	12		8		30
	Actual						
Credit	Planned	0.7	0.8		0.5		2
	Actual						

3. Individual study/learning hours expected for students per week. (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course students will be able to:		
1.1	- Know and understand the essential facts, terminology, major concepts and principles of biostatistics - Describe the role of Biostatistics in medical research. - Identify the steps of prioritization of research topics. - Identify sources of information. - Recognize the different research designs. - Demonstrate sampling and sample types. - Describe & interpret dispersion of data and normal distribution. - Understand the methods of acquiring, interpreting	- Provide clear and informative lecture notes with learning objectives that focus on important points. - Give clear, informative, and stimulating lectures to enhance the learning experience for students. - Answer questions either in or outside class or via e-mail. - Compose thoughtful and fair exam questions that assess student learning and application of the course content. - Directing the case sessions and facilitators to provide	Compose thoughtful and fair assessment tasks that assess student learning and application of the course content including - Essay - Periodical tests - Oral presentation - Group project - Final examination

	and analyzing biological information.	an effective learning experience in small group, team-oriented sessions.	
2.0	**Cognitive Skills:** The course has an aim to improve the ability in the following cognitive Skills		
2.1	- Effective Learning skills - Problem solving skills. - Reading and searching and ability to review the literatures. - Plan and carry out epidemiological studies. - Analyze the data, using proper statistical tests.	- Lectures - Tutorials - Small group discussion - Task Based Learning	- MCQ examination. - Case Study - Research Report
3.0	**Interpersonal Skills & Responsibility**		
3.1	- The course aims to improve the ability in the interpersonal skills and responsibilities to improve student's Illustration of the notions of biostatistics analysis rules and interpretation.	- Tutorials - Small group discussion - Task Based Learning - Assignments. - Hands on demonstration of skills (Computers, Software)	- Small group assessment as well as periodical discussions.
4.0	**Communication, Information Technology, Numerical**		
4.1	**The course aims to improve the ability in the following Information Technology and Numerical Skills:** - Literature search. - Data management. - Data analysis and report writing.	- Refer the students to websites links containing texts and content related to the given lecture that may help them for more understanding. - Stimulate the student to arise questions and look for the answers in the books or websites or search engines. - Tutorials - Small group discussion - Task Based Learning - Assignments. - Hands on demonstration of skills (Computers, Software)	Those skills can be predicted by: - The style and the level of the projects and assignments instructed and research report.
5.0	**Psychomotor(if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Assessment task (Essay)	2	15%
2	Assessment task (1st periodical test)	4	15%
3	Assessment task (Oral presentation)	7	15%
4	Assessment task (2nd periodical test)	10	15%
5	Assessment task (Group assignment :project)	12	15%
6	Assessment task (Final examination)	15	25%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

The student has the right to contact the lecturer or coordinators by their e-mails or during their office hours for academic advices or consultations.

E Learning Resources

1. List Required Textbooks

- Aviva, P.: Medical Statistics at a Glance, Blackwell Company, 2nd ed.,
- Barker DJP: Practical Epidemiology
- Armitage: Statistical methods in medical research
- Michael J. Campbell & David Machin: Medical Statistics: A commonsense approach
- Milton J Susan: Statistical Methods in the Biological & Health Sciences 3rd Ed. McGraw-Hill (1998)
- Statistics in Medical Research, 4th ed. Blackwell Publishing, 2003.

2. List Essential References Materials (Journals, Reports, etc.)

- Zar, J. H. (2009). Biostatistical Analysis, Prentice Hall

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- Glossary of Statistical Terms: biostat.mc.vanderbilt.edu/twiki/pub/Main/ClinStat/glossary.pdf
- HyperStat (by David Lane): davidmlane.com/hyperstat/ [An online book on basic statistics, with some useful links.]
- SticiGui (by Philip Stark): www.stat.berkeley.edu/~stark/SticiGui/ [An online non-technical textbook on introductory statistics, with applets to allow interactive learning.]
- Electronic Statistics Textbook (by StatSoft): www.statsoft.com/textbook/stathome.html

- Electronic Encyclopedia of Statistical Examples and Exercises (EESEE): www.whfreeman.com/eesee/ - Against All Odds: Inside Statistics: www.learner.org/resources/series65.html [A collection of 26 half-hour videos on basic concepts of statistics.]
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. - SPSS for widows,

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Auditoriums
2. Technology resources (AV, data show, Smart Board, software, etc.) - Audio-visual equipment for teaching (projector, microphones, speakers, board)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - Evaluation questionnaires of the staff at the end of the course
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development - Reviewing and implementing appropriate changes in the course based on the student feedback and evaluations
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. - Regular meeting to the staff to review the course effectiveness

Name of Course Instructor: Dr. Saleh Ahmed & Dr. Riyad Almaimani

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Molecular Pathogenesis and Diagnostics

Course Code: 1001601-2MPD

Date: **20/10/2018**	**Institution:**.**Umm Al Qura University**
College: **Faculty of Medicine**	**Department:** **Biochemistry**

A. Course Identification and General Information

1. Course title and code: **Molecular Pathogenesis and Diagnostics(1001601-2MPD)**			
2. Credit hours:**(2)**			
3. Program(s) in which the course is offered. **MSc of Clinical Biochemistry** (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: **Dr. Mohammad Althubiti & Dr Safaa Menesi**			
5. Level/year at which this course is offered: **Postgraduate Degree (MSc)**			
6. Pre-requisites for this course (if any):			
7. Co-requisites for this course (if any):			
8. Location if not on main campus:			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage?	60
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other	√	percentage?	40
Comments:			
Four contact hours will be offered by Medical Genetics department in the faculty of Medicine.			

B- Objectives

The main objective of this course is
To provide a comprehensive overview of the fundamental principles of molecular techniques and to explore the use of such techniques in the clinical diagnostic setting.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Regular improvement of this course will be carried out by implementation of new advances determined in the field of molecular diagnostics in both research and medical levels with suitable defining-methods of teaching including theory and laboratory.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is designed to:

- Provide basic and applied knowledge in the field of molecular diagnosis, describing the techniques commonly used in molecular diagnostic laboratories including screening programs.
- Emphasize on the underlying principles, applications, advantages and limitations of each technique (nucleic acid isolation, polymerase chain reaction (PCR), real-time PCR (RT-PCR), Electrophoresis, Genotyping, molecular cytology, next generation sequencing (NGS), protein microarray, …
- Furthermore, the course will deal with the requirements to implement such technologies and how to set up a molecular diagnostic laboratory.

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

- Describe concepts in molecular diagnostics that provide the foundation for implementing and adapting new techniques and assays.
- Describe the principle of nucleic acid isolation from blood and different body fluids and how to store RNA and DNA for further analysis.
- Define and perform the polymerase chain reaction (PCR), RT- PCR, electrophoresis, and other amplification techniques.
- Describe hybridization techniques (FISH, ISH)
- Apply molecular diagnostic techniques in different medical disciplines including endocrinology, hematology, oncology, prenatal, Infectious diseases, emphasizing on the pre-marital genetic screening test and neonatal screening program of Saudi mandatory program.
- Discuss ethical considerations of molecular test results such as privacy and discrimination.

- Recognize the frontiers of point-of-care using molecular diagnostic technologies.
- Describe how to set up a molecular diagnostic laboratory.

Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Nucleic acid: (structure, replication, transcription, translation)	1	2
Molecular investigations in body fluids, saliva, Blood, CSF, amniotic fluid, urine: preparing the sample, Nucleic acid extraction methods, determination, precautions, storage, analysis	1	4
Nucleic acid amplification/detection techniques and applications: - PCR, RT-PCR, nested RT-PCR, electrophoresis, ELISA, (HCV, HBV, HIV, TB, CMV, Hb electrophoresis, serum electrophoresis, Research targets), Limitations to Molecular Testing	1	4
Molecular Oncology: Classification of neoplasms, molecular basis of cancer, analytical targets of testing	2	4
Techniques in the Clinical Molecular Lab - DNA Polymorphisms and Human Identification: Molecular Mutation detection/screening techniques and applications. (types of DNA polymorphisms, PCR-RFLP, automation), applications in diagnosis of genetic disorders (Glycogen storage diseases, thalassemia, gene therapy, Parentage Testing, ABO blood group antigens), ethical considerations,	1	4
Techniques in the Clinical Molecular Lab - Molecular Genotyping techniques and applications human genome project, Inherited diseases (SNPs), (forensic analysis, Inborn error metabolism, transplants, Pharmacogenetics);	1	2
Molecular diagnosis in Screening Tests: - pre-marital genetic testing of Saudi mandatory program for screening for a number of diseases, including sickle-cell anemia and HIV “genetic incompatibilities”/ - Newborn genetic screening programs. - The genetic disorders should be included in the screening programs: phenylketonuria (PKU), cystic fibrosis, sickle cell disease, critical congenital heart disease, hearing loss, and others.	1	2
Molecular Bio-informatics: - Sequence assembly, Genome annotation, Molecular evolution, Analysis of gene expression, Analysis of regulation, and Protein structure prediction	1	2

Techniques in the Clinical Molecular Lab - Molecular cytogenetics techniques and applications: detection of cryptic chromosomal aberrations; In situ nucleic acid hybridization and amplification (ISH, FISH). Applications and limitations	1	2
Molecular tests in Advanced point of care testing (Future vision): Requirements of Typical POC molecular diagnostic assay, POC devices (microfluidic devices)	1	2
Molecular Laboratory set up: Design and considerations	1	3
Discussion and course evaluation	1	2

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	24	3	4	4	-	35
	Actual						
Credit	Planned	1	0.25	0.25	0.5		2 CU
	Actual						

3. Individual study/learning hours expected for students per week. (3 hrs)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	• Define concepts in molecular diagnostics that provide the foundation for implementing and adapting new techniques and assays.	lecture	Written Single Best Answer
1.2	• Describe the principle of nucleic acid isolation from blood and different body fluids and how to store RNA and DNA for further analysis.	lecture	Written Single Best Answer
2.0	**Cognitive Skills**		
2.1	• Perform the polymerase chain reaction (PCR), RT- PCR, and other amplification techniques.	Lecture Laboratory	Written Single Best Answer OSPE
	• Explain and perform electrophoresis and hybridization techniques	Lecture Laboratory	SBA Practical / OSPE
3.0	**Interpersonal Skills & Responsibility**		
	• Performing nucleic acid extraction, amplification, and detection	Laboratory	Practical

3.1	• Apply molecular diagnostic techniques in different medical disciplines including endocrinology, hematology, oncology, prenatal, Infectious diseases	Interactive Teaching	Written Single Best Answer Oral presentation
3.2	• Define ethical considerations of molecular test results such as privacy and discrimination.	Case based Learning (CBL) Seminar	Written Single Best Answer Oral presentation
4.0	**Communication, Information Technology, Numerical**		
4.1	• Discuss the frontiers of point-of-care diagnostic technologies using a drop of blood obtained from a finger-prick.	Interactive Teaching	Written Single Best Answer Assignments
5.0	**Psychomotor (if any)**		
5.1	• Describe how to set up a molecular diagnostic laboratory.	Interactive Teaching Laboratory	Single best answer OSPE

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Interactive activity during lectures		10%
2	Laboratory assessment		25%
4	Oral presentation		10%
5	Integrated final course-exam (written)		55%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- All scientific materials of the course will be offered by high qualified academic members with high interest to react with the students.
- The course instructor of the course is a full-time academic doctor in the Biochemistry department in faculty of medicine.
- Office hours for all staff members will be scheduled and distributed to all candidates under the supervision of the head of the department.
- Electronic/media contacts will be established for coordination and scientific assistance including Email, DROPBOX, Google drive, WhatsApp group.

E Learning Resources

1. List Required Textbooks

Molecular Diagnostics: Fundamentals, Methods and Clinical Applications
2nd Edition, 2002. **Lela Buckingham** PhD, MB, DLM(ASCP)

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.) - Maintenance contracts are required for the labs and instruments in the biochemistry labs in faculty of Medicine. - Purchasing the materials and kits that will be used in teaching of scheduled lab-sessions.
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Traditional Classrooms in faculty of Medicine. - Labs in both Biochemistry and Genetics departments, faculty of Medicine. - Meeting room of biochemistry department for oral presentations**.**
2. Technology resources (AV, data show, Smart Board, software, etc.) - Essential technology resources are available in the faculty of medicine including (Smart board, data show, Internet access in presentation room,..)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) - Highly equipped molecular biology lab is available with well trained technicians in biochemistry department. - Genetic lab with equipments NGS (ION-Proton sequencer for whole exome sequencing). - Free WIFI access will be requested for all places allocated for the teaching. - Slides

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - All quality standards will be performed during and at the end of the course including well-constructed student opinion- surveys for all components of the course including effectiveness of : teaching (methods, staff), laboratories, assessment, schedule, student guide
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department - The instructor of the course will be responsible for gathering all feedback comments from stakeholders and all results of surveys from Allstakeholders (Staff, lab technicians, and students), then analyze and determine all weak and strength points in the course.

- All results and suggested action plans will be evaluated through the higher committee of the program for approval and implementation.

3. Procedures for Teaching Development

- The instructor of the course will be responsible for performing student opinion surveys concerning teaching process, gathering the results, analyzing and determining all weak and strength points in the teaching process in the course, suggesting the action plans.
- Survey results and suggested action plans will be evaluated through the higher committee of the program for approval.

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- All results of the students will be evaluated using Bell curve-chart.
- Bench mark of the course results will be performed with the other courses in the program and with other external comparable -programs offered for postgraduates.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- The instructor of the course will be responsible for gathering all feedback comments from stakeholders and all results of surveys form stakeholders (Staff and student), then analyze and determine all weak and strength points in the course, suggesting the action plans.
- All results and suggested action plans will be evaluated through the higher committee of the program for approval.

Name of Course Instructor: Dr. Mohammad Althubiti & Dr Safaa Menesi

Signature: **Date Completed:**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Core Clinical Biochemistry

Course Code: 1001601-3CBIO

Date: 22/10/2018	**Institution:** Umm Al Qura University
College: Faculty of Medicine.	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code**: Clinical Biochemistry (1001601-3CBIO)**
2. Credit hours: (3)
3. Program(s) in which the course is offered: Clinical Biochemistry Master Degree
4. Name of faculty member responsible for the course:
Prof. Essam Nour Aldin & Dr. Hala Kamel
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Graduate degree from appropriate and recognized college of applied medical sciences or pharmacy or medicine or equivalent.
7. Co-requisites for this course (if any):
   C. The student should have overall grade “Good” in bachelor and “very good” in Biochemistry courses in undergraduate study.
   D. Evidence of English exam satisfaction
8. Location if not on main campus: Biochemistry Departments
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	50
b. Blended (case discussion)	√	percentage?	20
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other: (CBL) case-based learning	√	percentage?	30

Comments:

Case discussion sessions are performed as group discussion for applications of laboratory tests for management of diseases or conditions and to be able to organize the course information around Case Scenarios from the perspective of the laboratory work up.

B- Objectives

The main objective of this course:

The overall objective of this course of the master degree is developing a detailed knowledge of the applications of Clinical Biochemistry for the diagnosis of human disease and its contribution to biomedical research. The students will be able to assess the effectiveness of individual tests, strategies and protocols for the investigation of disease. The course develops comprehensive understanding that is informed by the forefront of the field of Clinical Biochemistry and will be capable of applying these to developing new insights and to problem solving using knowledge and creativity.

This course is expected to provide students with an introduction to the concept, basic knowledge, and practice of clinical biochemistry. Specifically, it will provide students with an appreciation of the role of the clinical biochemistry laboratory in the diagnosis and management of common diseases.

The specific objectives of this course to:

1. To provide the basic knowledge and understanding of the scientific basis and practice of clinical biochemistry of disease processes using biochemical laboratory investigations.
2. To describe the scope and importance of the investigations implemented in the Clinical Biochemistry laboratory.
3. To recognize the role of Clinical Biochemistry tests in the diagnosis, studying, and monitoring disease states.
4. To develop the required skills to report life-threatening laboratory results and to be able to discuss effectively with other clinicians.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

1) They will deal with electronic books in the field, as they are using now many web based reference material.
2) Clinical biochemistry seminars.
3) Real cases result from hospitals and discuss effectively the diagnosis in group discussion.
4) Activation of self-learning through assignments and activities as case presentation and discussion of case scenarios.
5) Research project for selected up-to-date topics that recently apply in clinical biochemistry and not covered in the course
6) Updating of contents is a continuous process for the course.

C- Course Description (Note: General description in the form used in the program's bulletin or handbook)

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
1. <u>Introduction to clinical Biochemistry:</u> – Basic principles and practice – Uses of Clinical Biochemistry testing; types of tests – Biomarkers; sensitivity and specificity – interpreting tests; reference values; Variation of test results – **Case discussion**: pre and post analytical errors, acceptance of test results.	1	3
2. <u>Fluid and electrolyte balance& disorders</u> – Body fluid components & Water and electrolytes& osmolality – Water depletion and excess – Clinical features and investigation of sodium depletion and excess: hypo- and Hypernatremia – Clinical features and investigation of hypo- and Hyperkalemia – Errors in reporting (Sodium and potassium) & Critical values – Chloride, anion gap – **Case discussion**: Dehydration, Syndrome of inappropriate antidiuretics (SIADH)	2	6
3. <u>Renal Function Tests & Urine analysis</u> – Glomerular functions & Renal functions and assessment – Glomerular filtration rate – Urine Analysis and Renal Stones – **Case discussion**: Acute and chronic renal failure, proteinuria	2	6
4. <u>Acid base balance and disorders</u> – Acid-base homeostasis, buffers; compensatory mechanisms – The concept of actual bicarbonate, standard bicarbonate, and base excess – Oxygen saturation – Determinants and assessment of tissue oxygenation – Collection of blood specimens for blood gas estimations – **Case discussion**: Metabolic acidosis; alkalosis and respiratory acidosis; alkalosis ; mixed acid base disorders	2	6
5. <u>Assessment of Liver Functions & Jaundice</u> – Liver function tests (LFTs), bilirubin metabolism – Cholestasis, testing and interpretation in jaundice – Gall stones and their composition – **Case discussion**: Jaundice, neonatal Jaundice, liver cell failure	2	6
6. <u>Plasma proteins</u> – Testing for total proteins and albumin – Acute phase reactant proteins – Electrophoresis of serum proteins – Immunoglobulin – **Case discussion**: Hypoalbuminemia, Rheumatic fever,	1	3
7. <u>Blood glucose testing; diabetes mellitus and hypoglycemia:</u> – Diagnostic and follow up testing in diabetes and diabetic complications	2	6

– Testing for blood and urine glucose and interpretation – Home monitoring with reagent pad tests and meters – Glycated hemoglobin and glycated proteins – laboratory investigation of hypoglycemia – Use of insulin, C-peptide, and glucagon assays – **Case discussion**: diabetic ketoacidosis, hypoglycemia		
8. <u>Clinical Enzymology</u> – Enzymes; Isoenzymes of clinical significance; Amylase and lipase – Factors affecting results of plasma enzyme assays – Functional plasma enzymes – **Case discussion**: acute pancreatitis, liver cell failure,	1	3
9. <u>Lipid Profile</u> – Sampling for lipid profile: Plasma lipids, FA, cholesterol, and lipoprotein – **Case discussion**: Hypercholesterolemia, hyper- and hypo-lipoproteinemia	1	3
10. <u>Calcium; Phosphate, and Magnesium,</u> – Homeostasis and assessment of Calcium, phosphate, and magnesium – **Case discussion:** Hypercalcemia, Hypocalcemia, Hypo- and hyperphosphatemia; Renal osteodystrophy,	1	3

2. Course components (total contact and credit hours per semester):

		Lecture Interactive lectures	CBL/ tutorials	Laboratory / Studio	Practical	Case discussion	Total
Contact Hours	Planned	30	15			15	60
	Actual						
Credit	Planned	2	0.5			0.5	3 CU
	Actual						

3. Individual study/learning hours expected for students per week. (4)

On the table below are the five NQF Learning Domains, numbered in the left column.

5. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Recognize and discuss the implications of altered structure and function and biochemistry of the body and its major systems that are seen in various diseases and conditions.	▪Lectures ▪IL ▪Tutorials ▪self -study activities: for assigned questions with	-Written exam -Single Best Answer (SBA) are constructed through blue print as : ▶15% knowledge
1.2	Define specific biochemical markers of disease		

1.3	Describe in terms of impact organ function testing (renal function tests, liver function tests, arterial blood gases	answers and review ▪CBL ▪Case discussion	▶45% Analysis and cognitive ▶40% interpretation and problem solving -Assignments' presentation
1.4	Describe the molecular basis and maladies and the way in which they affect the body		
1.5	Illustrate the role of laboratory testing in diagnosis, treatment, and monitoring of patients with certain medical or surgical disorders		
2.0	**Cognitive Skills**		
2.1	Correlate causes, symptoms, signs, and complications to biochemical events and altered laboratory parameters	▪Lecture ▪Interactive lectures ▪Tutorials; using group discussion and problem solving. ▪Whole group and small group discussion, debate and analysis of case scenarios beside small group work. ▪Case discussion.	-Written exam -Single Best Answer (SBA) are constructed through blue print as : ▶15% knowledge ▶45% Analysis and cognitive ▶40% interpretation and problem solving -Assignments' presentation; seminars -Research project
2.2	Criticize commonly encountered sources of interference in biochemical analysis		
2.3	Critically appraise and objectively interpret the investigation results.		
2.4	Correlate patients' test results with clinical pathology.		
2.5	Interpretation of the requested investigations with consideration of the clinical circumstances and the possible contribution of any analytical, individual or biological variation		
2.6	Discuss sources of discrepancy in terms of pre-analytical and analytical errors in lab testing.		
2.7	Outline the role of quality control measures within clinical biochemistry laboratory.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Appraise requesting clarification of unexpected test results	▪Group discussion for case scenario: students try to discuss in groups how to reach the final diagnosis for that case scenario. ▪Role-play exercise on controversial issue relevant to the course based on a case study, with discussion in tutorial of appropriate responses and consequences to	▪Assessment of group assignment includes: component for individual contribution: in which 25% of total assessment marks is based on individual's contribution to the group task. ▪Group and individual assignments require application of analytical tools and some open ended tasks
3.2	Report the collected information clearly in either verbal or written form		
3.3	Verifying test results according to accepted practice for routine, emergency, and critical values.		
3.4	Correlate panel testing or group of parameters analysis e.g. electrolyte analysis and assessment tests for acid base disorders.		
3.5	Acquire the effective behavior in work as an individual or member of a team.		
3.6	Appraise requesting clarification of unexpected test results.		

		individuals involved.	designed to apply predictive, analytical and problem solving skills Seminar
4.0	**Communication, Information Technology, Numerical**		
4.1	Revise the different concepts and report it in a clear, concise, and effective manner.	▪IL ▪Discussions in the tutorial and case scenario sessions. ▪Group assignments require student to select hospital cases then discus in groups how to reach final diagnosis, they also have to use library reference material and web sites to identify information required to complete their activity	▪Group assessment for reports ▪Assignment assessment ▪Discussions in the tutorial sessions. ▪Group and individual Presentation for case scenarios they chose as group assignment
4.2	Modify effective communication skills (verbal and written).		
4.3	Successfully utilize a range of information sources including information technology / health informatics		
4.4	Calculate results of some parameters as osmolality, creatinine clearance, H_2CO_3, HCO_3, PCO_2, oxygen capacity, and oxygen content.		
4.5	Illustrate briefly biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools		
4.6	Display the personal attributes of compassion, honesty, and integrity in relationships with patients and the medical profession.		
5.0	**Psychomotor (if any)**		
5.1			

6. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	5 %
2	Mid –term MCQ	7th week	20%
3	Presentation of group assignment (case discussion)	8th Week	10 %
4	Problem based Learning evaluation (small group discussion)	Continuous assessment	5%
5	Seminar	12th week	5 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written ; integrated)	Week 16	55%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The teaching staffs involved in the course are available for student consultations and academic advice at the assigned office hours of each staff member.
- Course organizer and teaching staffs of this course are happy to answer all students' quires during and after the teaching activities.
- The student leader usually has the mobile number of the teaching staffs and allows contacting him in case of any queries.
- All students have the all available contact information of teaching staffs.

E Learning Resources

1. List Required Textbooks

- Clinical Biochemistry: An Illustrated Colour Text [online] 5th edition. Churchill Livingstone. Gaw, A., Murphy, M. J., Srivastava, R., Cowan, R. A. and O'Reilly, D. (2013) available from <https://www.dawsonera.com/guard/protected/dawson.jsp?name=https://coventry.ac.uk/idp&dest=http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9780702054143>
- Clinical Biochemistry, Lecture Notes, Simon Walker; Geoffrey Beckett; Peter Rae; Peter Ashby (9th Edition) (2013) by John Wiley & Sons, available from <http://eu.alma.exlibrisgroup.com/view/action/uresolver.do?operation=resolveService&package_service_id=4608166020002011&institutionId=2011&customerId=2010
- Clinical Biochemistry. Institute of Biomedical Science (Great Britain) (2017) Second edition. ed. by Ahmed, N. vol. Fundamentals of biomedical science. Oxford: Oxford University Press
- Clinical Chemistry; Techniques, Principles, Correlations; Michael L. Bishop ; Edward P. Fody ; Larry E. Schoeff; (6th Edition; 2010) Lippincott Williams & Wilkins.
- Marshall, W.J., Day, A.P., and Lapsley, M. (2017) Clinical Chemistry. Eighth edition. Edinburgh: Elsevier
- Clinical Chemistry, a laboratory perspective 1St edition 2007. By Wendey Arneson and Jean Brickell, by F. A. Davis Company (ed)
- Tietz, N.W. (2015) Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics [online] Seventh edition. ed. by Burtis, C.A., Bruns, D.E., and Sawyer, B.G. St. Louis, Missouri: Elsevier. available from <http://evolve.elsevier.com/Tietz/fundamentals>
- Wilson, Keith and Walker, John M. (2005) Principles and Techniques of Biochemistry and Molecular Biology. 6th ed. Cambridge: Cambridge University Press.
- Kaplan L.A., Pesce A.J., and Kazmierczak S.C. Clinical Chemistry: Theory, Analysis, Correlation. Mosby. 2003, 1179 pp.

5. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

1. American association for clinical chemistry https://www.aacc.org/

2. International Federation for clinical chemistry and Laboratory Medicine http://www.ifcc.org/
3. European Federation of Clinical Chemistry and Laboratory Medicine http://www.efcclm.org/
4. Clinical Chemistry and Laboratory Medicine Journal http://www.degruyter.com/view/j/cclm
5. Clinical and Laboratory Standards Institute (CLSI) Guidelines: Access to CLSI Guidelines is available through the Laboratory Medicine Department, Tallaght Hospital. These guidelines are extensively referenced throughout the course.
6. Web Portals:
7. http://www.acbi.ie (Association of Clinical Biochemists in Ireland)
8. http://www.acb.org.uk/ (Association of Clinical Biochemists)
9. http://www.clsi.org (Clinical and Laboratory Standards Institute)
10. http://www.aacc.org (American Association of Clinical Chemistry; NACB guidelines)
11. http://www.acb.org.uk/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - Faculty of Medicine Classroom, Biochemistry Departments labs, Al-Noor hospital lab (Visit)

2. Technology resources (AV, data show, Smart Board, software, etc.)

Data show, Smart Board, software

2. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

3. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
   - University student's feedback about the course.
   - Discussion of standard course evaluation questionnaire.

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
   - Open discussions with the students
   - Student feedback.
   - Study and discussion of reports.

3. Procedures for Teaching Development

- Feedback of improved teaching methods from students and colleagues
- Review of recommended teaching strategies
- Put and flow the up to date strategies to develop the course

4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- Analysis of results according to standard methods of evaluation
- Assigned exam committee form Biochemistry department to check control the double check of all exam and results process
- Assigned staff member reviewers for students projects and activities not involved in the teaching the topic of activities.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- Student questionnaire about the effectiveness of the course in their practice
- Feedback from teaching staffs who's involved in the teaching process and taking in consideration their suggestions to develop this course.
- Analysis and evaluation of examination results every exam by course committee of the department.
- Reviewing system and time-table and the staff activities after analysis of results
- The course will be revised annually again after its delivery considering students' results of and the results of the course evaluation questionnaire by both students and teaching staff.
- The course director or committee will discuss these issues and put an improvement plan for each spotted problem, accordingly revise the course content and intended learning objectives

Name of Course Instructor: Prof. Essam Nour Aldin & Dr. Hala Kamel

Signature: **Date Completed: 22/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Specialized Clinical Biochemistry

Course Code: 1001601-3SBIO

Date: 22/10/2018	**Institution:**.Umm Al Qura University
College: Faculty of Medicine. **Department:** Biochemistry	

A. Course Identification and General Information

1. Course title and code: **Specialized Clinical Biochemistry (1001601-3SBIO)**
2. Credit hours: (3)
3. Program(s) in which the course is offered: Clinical Biochemistry Master Degree
(If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course:
Prof. Adel Assiri & Dr. Abeer Ahmed
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Graduate degree from appropriate and recognized college of applied medical sciences or pharmacy or medicine or equivalent.
7. Co-requisites for this course (if any):
   E. The student should have overall grade “Good” in bachelor and “very good” in Biochemistry courses in undergraduate study.
   F. Evidence of English exam satisfaction
8. Location if not on main campus: Biochemistry Departments
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	30
b. Blended (case discussion)	√	percentage?	20
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other : (CBL) case based learning	√	percentage?	30

Comments:

Case discussion sessions are performed as group discussion for applications of laboratory tests for management of diseases or conditions and to be able to organize the course information around Case Scenarios from the perspective of the laboratory work up. practical section is the main method of teaching in this course.

B- Objectives

The main objective of this course:

The overall objective of this course of the master degree is developing a detailed knowledge of the applications of Clinical Biochemistry in specialized topics as endocrinology disorders and dynamic testing, cardiac, tumor and bone biomarkers, in diagnosis and follow up of human disease and its contribution to biomedical research. The students will be able to assess the effectiveness of individual tests, strategies and protocols for the investigation of disease. The course develops comprehensive understanding that is informed by the forefront of the field of Clinical Biochemistry and will be capable of applying these to developing new insights and to problem solving using knowledge and creativity.

This course is expected to provide students with an introduction to the concept, basic knowledge, and practice of clinical biochemistry. Specifically, it will provide students with an appreciation of the role of the clinical biochemistry laboratory in the diagnosis and management of common diseases.

The specific objectives of this course to:

1. To provide the basic knowledge and understanding of the scientific basis and practice of clinical biochemistry of disease processes using biochemical laboratory investigations.
2. To describe the scope and importance of the investigations implemented in the Clinical Biochemistry laboratory.
3. To recognize the role of Clinical Biochemistry tests in the diagnosis, studying, and monitoring disease states.
4. To develop the required skills to report life-threatening laboratory results and to be able to discuss effectively with other clinicians.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

1) They will deal with electronic books in the field, as they are using now many web based reference material.
2) Clinical biochemistry seminar (weekly).
3) Real cases result from hospitals and discuss effectively the diagnosis in group discussion.
4) Activation of self-learning through assignments and activities as case presentation and discussion of case scenarios.
5) Research project for selected up-to-date topics that recently apply in clinical biochemistry and not covered in the course
6) Updating of contents is a continuous process for our course.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:		
1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
1. <u>Endocrinology and hormone assessment</u> – Basic concepts of Endocrine functions and feedback mechanisms. – Hormonal assessment and dynamic testing – Hypothalamus and pituitary disorders and assessment – Adrenal gland and gonadal disorders and assessment – Thyroid disorders and assessment – Parathyroid gland disorders – **Case discussion:** Acromegaly, Cushing, Addison's, Conn's syndrome……	4	12
2. <u>Pregnancy, contraception, and infertility</u> – Infertility, pregnancy testing, Ectopic pregnancy – Oral contraceptive and their metabolic effects – Gestational DM – Semen analysis – Tests of fetal wellbeing and feto-placental function: fetal lung maturity, Screening for Down's syndrome, fetal malformations and abnormalities – **Case discussion:** 1ry infertility, anovulation, ectopic pregnancy	2	6
3. <u>Cardiac biomarkers</u> – Assessment of hypertension and risk factors for atherosclerosis Biochemical markers of myocardial infarction – Cardiac failure and natriuretic peptides – D-dimers and deep vein thrombosis – **Case discussion:** Hypertension, acute coronary syndrome, Myocardial infarction, heart failure	1	3
4. <u>Vitamins, trace elements and nutritional assessment</u> – Assessment of nutritional status, vitamins, trace elements assays – Malabsorption, steatorrhea – Gastric fluid analysis, H. pylori testing – Trauma and sepsis – **Case discussion:** hypovitaminosis vit D, Protein energy malnutrition, peptic ulcer, obesity, nutritional support–parenteral and enteral nutrition, Anorexia nervosa	2	6

5. <u>Biomarkers for bone Diseases and arthritis</u> – Bone diseases in relation to parathyroid gland, renal function and vit D status. – Uric acid testing – Bone formation and bone resorption markers – **Case discussion:** Vitamin D deficiency , Osteoporosis, gouty arthritis, Osteomalacia, Hyper- and hypoparathyroidism, Paget's disease	1	3
6. <u>Cancer Biomarkers</u> – Uses, classification and clinical implication of cancer biomarkers – Ideal tumor marker – Oncofetal antigens, Steroids receptors, Immunophenotyping, DNA analyses – **Case discussion:** cancer biomarkers used in breast, prostate, hepatocellular and pancreatic cancer	1	3
7. <u>Body Fluid analysis</u> – Testing and interpretation of CSF, amniotic fluid, Pleural and ascetic fluid and sweat – **Case discussion:** pleural effusion, empyema , polyhydramnios , Meningitis	1	3
8. <u>Disorders of haem metabolism: iron and porphyrins</u> – Nutritional anemia and its investigations: Ferritin, Iron, Transferrin – Abnormal hemoglobin; thalassemia, and sickle cell disease – Porphyrins and their precursors (ALA & PBG) – **Case discussion:** Megaloblastic anemia, porphyria	1	3
9. <u>Clinical biochemistry at extremes age</u> – Pediatric Clinical Biochemistry and inborn error of metabolism – Clinical biochemistry and the Geriatric patients – **Case discussion:** assessment of geriatric patients with diabetic, hypothyroidism or renal impairment; screening program for neonates	2	6

2. Course components (total contact and credit hours per semester):

		Lecture Interactive lectures	CBL/ tutorials	Practical	Case discussion	Total
Contact Hours	Planned	30	15		15	60
	Actual					
Credit	Planned	2	0.5		0.5	3 CU
	Actual					

3- Individual study/learning hours expected for students per week (4)

Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map			
Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Recognize and discuss the implications of altered structure and function and biochemistry of the body and its major systems that are seen in various diseases and conditions.	▪Lectures ▪IL ▪Tutorials ▪self -study activities: for assigned questions with answers and review ▪CBL ▪Case discussion	-Written exam -Single Best Answer (SBA) are constructed through blue print as: • 15% knowledge • 45% Analysis and cognitive • 40% interpretation and problem solving -Assignments' presentation
1.2	Define specific biochemical markers of certain diseases		
1.3	Outline cascade of control and feedback mechanism for hormone action, synthesis of hormones by glandular tissue, and distribution, transport, and roles of hormones within the body.		
1.4	Outline Imbalances in homeostasis of endocrine systems, including problems with growth and development and even life-threatening metabolic problems.		
1.5	Illustrate the role of laboratory testing in diagnosis, treatment, and monitoring of patients with certain Endocrinal and medical disorders		
1.6	Discuss common sources of discrepancies in patients' test results, including what appropriate action is needed and when to interfere.		
2.0	**Cognitive Skills**		
2.1	Differentiate primary and secondary hormonal disorders in terms of causes and typical laboratory results.	▪Lecture ▪Interactive lectures ▪Tutorials; using group discussion and problem solving. ▪Whole group and small group discussion, debate and analysis of case scenarios beside small group work.	Written exam -Single Best Answer are constructed through blue print as: - 15% knowledge - 45% Analysis and cognitive - 40% interpretation and problem solving -Assignments' presentation; seminars -Research project
2.2	Criticize commonly encountered sources of interference in biochemical analysis		
2.3	Critically appraise and objectively interpret the investigation results.		
2.4	Correlate patients' test results with clinical pathology.		
2.5	Interpretation of the requested investigations with consideration of the clinical circumstances and the possible contribution of any		

	analytical , individual or biological variation	▪Case discussion.	
2.6	Discuss sources of discrepancy in terms of pre-analytical and analytical errors in lab testing.		
2.7	Outline the role of quality control measures within clinical biochemistry laboratory.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Appraise requesting clarification of unexpected test results	▪ Group discussion for case scenario: students try to discuss in groups how to reach the final diagnosis for that case scenario. ▪Role-play exercise on controversial issue relevant to the course based on a case study, with discussion in tutorial of appropriate responses and consequences to individuals involved.	▪Assessment of group assignment includes: component for individual contribution: in which 25% of total assessment marks is based on individual's contribution to the group task. ▪Group and individual assignments require application of analytical tools and some open ended tasks designed to apply predictive, analytical and problem solving skills Seminar
3.2	Verification of patient preparation or sample collection for suspected discrepancies.		
3.3	Verifying test results according to accepted practice for routine, emergency, and critical values.		
3.4	Correlate panel testing or group of parameters analysis e.g. hormonal assessments, dynamic tests in endocrinal disorders, panel of tumor markers		
3.5	Acquire the effective behavior in work as an individual or member of a team.		
3.6	Appraise requesting clarification of unexpected test results.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Revise the different concepts and report it in a clear, concise, and effective manner.	▪IL ▪Discussions in the tutorial and case scenario sessions. ▪Group assignments require student to select hospital cases then discus in groups how to reach final diagnosis, they also have to use library reference material and web sites to	▪Group assessment for reports ▪Assignment assessment ▪Discussions in the tutorial sessions. ▪Group and individual Presentation for case scenarios they chose as group assignment
4.2	Modify effective communication skills (verbal and written).		
4.3	Successfully utilize a range of information sources including information technology / health informatics		
4.4	Appraise the dynamic tests and hormonal evaluation and assessment of hormone levels.		
4.5	Illustrate briefly biochemical methodology in order to be aware with the clinical biochemistry techniques as diagnostic tools		
4.6	Display the personal attributes of compassion, honesty, and integrity		

	in relationships with patients and the medical profession.	identify information required to complete their activity	
5.0	**Psychomotor (if any)**		
5.1			
5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	5 %
2	Mid –term MCQ	7th week	20%
3	Presentation of group assignment (case discussion)	8th Week	10 %
4	Problem based Learning evaluation (small group discussion)	Continuous assessment	5%
5	Seminar	12th week	5 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	55 %

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The teaching staffs involved in the course are available for student consultations and academic advice at the assigned office hours of each staff member.
- Course organizer and teaching staffs of this course are happy to answer all students' quires during and after the teaching activities.
- The student leader usually has the mobile number of the teaching staffs and allows contacting him in case of any queries.
- All students have the all available contact information of teaching staffs.

E Learning Resources

1. List Required Textbooks

- Clinical Biochemistry: An Illustrated Colour Text [online] 5th edition. Churchill Livingstone. Gaw, A., Murphy, M. J., Srivastava, R., Cowan, R. A. and O'Reilly, D. (2013) available from <https://www.dawsonera.com/guard/protected/dawson.jsp?name=https://coventry.ac.uk/idp&dest=http://www.dawsonera.com/depp/reader/protected/external/AbstractView/S9780702054143>
- Clinical Biochemistry, Lecture Notes, Simon Walker; Geoffrey Beckett; Peter Rae; Peter Ashby (9th Edition) (2013)by John Wiley & Sons, available from <http://eu.alma.exlibrisgroup.com/view/action/uresolver.do?operation=resolveService&package_service_id=4608166020002011&institutionId=2011&customerId=2010>

- Clinical Biochemistry. Institute of Biomedical Science (Great Britain) (2017) Second edition. ed. by Ahmed, N. vol. Fundamentals of biomedical science. Oxford: Oxford University Press
- Clinical Chemistry; Techniques, Principles, Correlations; Michael L. Bishop ; Edward P. Fody ; Larry E. Schoeff; (6th Edition; 2010) Lippincott Williams & Wilkins.
- Marshall, W.J., Day, A.P., and Lapsley, M. (2017) Clinical Chemistry. Eighth edition. Edinburgh: Elsevier
- Clinical Chemistry, a laboratory perspective 1St edition 2007. By Wendey Arneson and Jean Brickell, by F. A. Davis Company (ed)
- Tietz, N.W. (2015) Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics [online] Seventh edition. ed. by Burtis, C.A., Bruns, D.E., and Sawyer, B.G. St. Louis, Missouri: Elsevier. available from <http://evolve.elsevier.com/Tietz/fundamentals>
- Wilson, Keith and Walker, John M. (2005) Principles and Techniques of Biochemistry and Molecular Biology. 6th ed. Cambridge: Cambridge University Press.
- Kaplan L.A. , Pesce A.J. , and Kazmierczak S.C. Clinical Chemistry: Theory, Analysis, Correlation. Mosby. 2003,

6. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - American association for clinical chemistry https://www.aacc.org/
   - International Federation for clinical chemistry and Laboratory Medicine http://www.ifcc.org/
   - European Federation of Clinical Chemistry and Laboratory Medicine http://www.efcclm.org/
   - Clinical Chemistry and Laboratory Medicine Journal http://www.degruyter.com/view/j/cclm
   - Clinical and Laboratory Standards Institute (CLSI) Guidelines: Access to CLSI Guidelines is available through the Laboratory Medicine Department, Tallaght Hospital. These guidelines are extensively referenced throughout the course.
   - Web Portals:
   - http://www.acbi.ie (Association of Clinical Biochemists in Ireland)
   - http://www.acb.org.uk/ (Association of Clinical Biochemists)
   - http://www.clsi.org (Clinical and Laboratory Standards Institute)
   - http://www.aacc.org (American Association of Clinical Chemistry; NACB guidelines)
   - http://www.acb.org.uk/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - Faculty of Medicine Classroom, Biochemistry Departments labs, Al-Noor hospital lab (Visit)

2. Technology resources (AV, data show, Smart Board, software, etc.)
Data show, Smart Board, software

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

4. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports.
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies • Put and flow the up to date strategies to develop the course
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard methods of evaluation • Assigned exam committee form Biochemistry department to check control the double check of all exam and results process • Assigned staff member reviewers for students projects and activities not involved in the teaching the topic of activities.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice • Feedback from teaching staffs who's involved in the teaching process and taking in consideration their suggestions to develop this course. • Analysis and evaluation of examination results every exam by course committee of the department. • Reviewing system and time-table and the staff activities after analysis of results • The course will be revised annually again after its delivery considering students' results of and the results of the course evaluation questionnaire by both students and teaching staff. • The course director or committee will discuss these issues and put an improvement plan for each spotted problem, accordingly revise the course content and intended learning objectives

Name of Course Instructor: Prof. Adel Assiri & Dr. Abeer Ahmed

Signature: **Date Completed: 22/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Drug Monitoring & Toxicology

Course Code: 1001601-2DMT

Date: 18/10/2018	**Institution:** Umm Al Qura University
College: Faculty of Medicine	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: **Drug Monitoring & Toxicology (1001601-2DMT)**
2. Credit hours: (2)
3. Program(s) in which the course is offered.
   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course
   Dr. Mohammed Mukhtar & Dr. Heba Adly
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Undergraduate Biomedical Sciences/ Medicine
7. Co-requisites for this course (if any):
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	30
b. Blended (traditional and online)	√	percentage?	10
c. E-learning	√	percentage?	20
d. Correspondence		percentage?	
f. Other	√	percentage?	40

Comments:

B- Objectives

7. The main objective of this course

Drug monitoring and toxicology course aims to provide students with a wide range of systems of quality assurance of a drug management to demonstrate the concept, techniques, application of monitoring the most common therapeutic and abusive drugs. Ensuring proper and robust methods to detect drugs of abuse and determine concentrations of prescribed medications, and communicating and collaborating with clinicians to understand and interpret the results. It involves the analysis, assessment, and evaluation of circulating concentrations of drugs in serum, plasma, or whole blood. The purpose of these actions is to ensure that a given drug dosage produces maximal therapeutic benefit and minimal toxic adverse effects.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

Case based seminars- Presentations- Essays

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course:

This course provides an overview of the discipline of biochemistry laboratory and discusses the utility, rationale, and practice. The course objectives are to:

- Describe the principles of analyses for therapeutic drugs, drugs of abuse, and alcohol in terms of key reagents, their roles, and endpoint detection. Explain the concept of elimination half-life.
- List the criteria and attributes of commonly monitored drugs. the concept of pharamacogenomics, giving clinical examples of its importance;
- Discuss methods that are used for the measurement of therapeutic drugs in serum, urine and other body fluids.
- Define pharmacogenomics, polymorphism and CYP450; explain what is meant by 'individualized medicine' or 'personalized medicine'.
- Explain the usefulness of CYP450 testing as well as its shortcomings.
- Provide a broad, modern knowledge and training in the theoretical and practical aspects of toxicology.
- Prepare students to collate, interpret and communicate toxicological information
- Provide an opportunity to study at the cutting edge of research in a chosen specialist field of toxicology in clinical practice.
- Develop student awareness of the importance of toxicology to industry, health, the environment and society.

Essay:

This essay will take place the course delivery and is an opportunity for the student to select a search topic from their area of interest. Search can be case based, or literature/survey based. A wide variety of opportunities are available but, in all cases, students will

investigate a toxicological problem in depth and write a detailed report of their findings for submission.

1. Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Introduction drug monitoring and toxicology	1	3
-Bioavailability, Pharmacodynamics, Pharmacokinetics - Appropriate test material: whole blood, sera, plasma, CSF	1	2
Forensic Clinical and Occupational Toxicology Specimen Handling for Forensic toxicology; Illegal drugs; alcohol	1	2
Measurement of therapeutic drugs Methods of analysis for therapeutic drugs : HPLC, immunoassay	1	3
Define drug monitoring and its rationale	1	2
Criteria and attributes of commonly monitored drugs antibiotics- Anticonvulsants- Immunosuppressants- Cardiac Medications, Digoxin, antiepileptic, Psychoactive Drugs, Antineoplastic Drugs, Immunosuppressive Drugs, Lithium, Multi drug resistance: MDR	1	4
Classic pharmacokinetics: logarithms and other estimation methods.	1	2
Non-pharmacokinetic sources of variation: attributions of the nurses, the pharmacy, and the laboratory. Multidisciplinary approach: laboratory, physician-pharmacist	1	2
•Interpretation of the results in relation to the dose، time and other drug interaction	1	2
Therapeutic / toxic range Drug-of-abuse testing	1	2
Acute poisoning & toxicity Acetaminophen, salicylates, heavy metal toxicity, Organic solvents, pesticides	1	2
Factors affecting therapeutic precision	1	2
Drug Elimination	1	2
Regulatory Science and Toxicology for the new Century	1	2
Essay	1	2

2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact	Planned	10	10	10	--	5	30

Hours	Actual						
Credit	Planned						2 CU
	Actual						

3. Individual study/learning hours expected for students per week (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Describes the disposition of foreign compounds within the body of living organisms	Interactive Lecture	Assignments Case scenarios
1.2	Introduce Bioavailability	Interactive Lecture	Assignments Case scenarios
1.3	Introduce safety	Interactive Lecture	Assignments Case scenarios
	List common preanalytical errors resulting from improper specimen collection and handling for therapeutic drugs, alcohol, and drugs of abuse.		
2.0	**Cognitive Skills**		
2.1	Identify potential toxicity	Interactive Lecture	Assignments Case scenarios
	Analyze advantages and disadvantages of drug measurements in urine		
2.2	Distinguish between hazards and risks	Interactive Lecture	Assignments Case scenarios
	Compare and correlate alcohol and mercury results with expected findings and with pathology, suggesting appropriate course of action.	Interactive Lecture	Assignments Case scenarios
2.3	Develops the clinical aspects of toxicology	Interactive Lecture	Assignments Case scenarios
	Describe the correct method of recording patient therapeutic drug and drug of abuse results, including decimal place and unit.	Interactive Lecture	Assignments Case scenarios
3.0	**Interpersonal Skills & Responsibility**		
3.1	Design experiments and to apply statistical analysis to toxicological data	Group activity	Oral presentation seminars

3.2	Literature searching/information retrieval and communication of their findings in written reports	Group activity	Oral presentation seminars. Essays
	Evaluate patient sample collection and handling processes in terms of impact on the outcome to include communicating with other members of the health-care team.	Group activity	Oral presentation seminars
3.3	Student-centred learning. Students are given time to work through all the topics covered	Group activity	Oral presentation seminars
4.0	**Communication, Information Technology, Numerical**		
4.1	IT skills training involving structure activity relationships and metabolism prediction computer simulations	Task Based Learning	Oral presentation seminars about subject related to the course in groups Essays
	Discuss situations regarding acetaminophen and drugs of abuse in which it is important regarding medicolegal aspects	Task Based Learning	Oral presentation seminars about subject related to the course in groups Essays
4.2	Identify the principal of toxicity and health of health	Task Based Learning	Oral presentation seminars about subject related to the course in groups. Essays
5.0	**Psychomotor (if any)**		
5.1	Apply advanced instrumentation for the analysis of small molecules in patient samples.	Assignments (essays & oral presentation). Problem Based Learning (PBL). Case presentations.	Assignments (essays & oral presentation).

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation	**Week Due**	**Proportion of Total Assessment**
1	Attendance at lectures		10%
2	Completion of case-based assignments		30%
3	Completion of the literature review		30%
4	Oral presentation		20%
5	Satisfactory performance/demonstration of learning objectives		10%

D. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The lecturers involved in the course to be available for student consultations and academic advice.
- Course organizer and lecturers of the course are happy to answer all students' quires during or after the lectures, and they can be reached by personal meeting, phones or e-mails.
- Student representative usually have the mobile number of the lecturer to contact him in case of any queries.
- All students have the e-mail of the lecturer.

E Learning Resources

1. List Required Textbooks

- Drug Monitoring Methods Textbook, Department of Pathology and Laboratory Medicine -University of Texas-Houston Medical School, Houston,2017
- Therapeutic Drug Monitoring Textbook, 2012

2. List Essential References Materials (Journals, Reports, etc.)

- Alicia Hutcherson Wright, Jeffrey A. Young, Breland Elise Smith, Alec Saitman. The Missing Metabolite: How Unexpected Urine Drug Metabolite Patterns May Lead to False Interpretations, 2018
- Therapeutic drug monitoring: which drugs, why, when and how to do it RA Ghiculescu, Senior Clinical Pharmacology Registrar, Department of Clinical Pharmacology, Princess Alexandra Hospital, Brisbane, 2018
- Gross AS. Best practice in therapeutic drug monitoring. Br J Clin Pharmacol,2009
- Best practice in therapeutic drug monitoring,2008
- Dasgupta A. How people try to beat drug testing: issues with urinary adulterants and their detection. Clin Lab New Feb 2015; 41.
- Substance Abuse and Mental Health Services Administration. Mandatory guidelines for federal workplace drug testing programs. 73 Fed Reg 71858. Section 3.4. 2008. pp. 24–5. https://www.federalregister.gov/documents/2008/11/25/E8-26726/ -guidelines-for-federal-workplace-drug-testing-programs (Accessed February 2018)

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- www.who.int
- www.wwfindia.org
- www.unep.org

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Faculty of Medicine Classroom
2. Technology resources (AV, data show, Smart Board, software, etc.) • Data show, Smart Board, software
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

5. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports.
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard curve
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice

Name of Course Instructor: Dr. Mohammed Mukhtar & Dr. Heba Adly

Signature: **Date Completed: 16/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

COURSE SPECIFICATIONS

Form

Course Title: Hospital Laboratory Training

Course Code: 1001601-4HLT

Date: 20/10/2018	**Institution:** Umm Al Qura University
College: Faculty of Medicine	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: **Hospital Laboratory Training (1001601-4HLT)**
2. Credit hours: (4)
3. Program(s) in which the course is offered.

   (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course

   Prof. Essam Nour Eldin & Dr. Altaf Abdulkhaliq & Dr. Hala Kamel & Dr. Abeer Ahmed Alrefai
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Undergraduate Biomedical Sciences/ Medicine
7. Co-requisites for this course (if any):----
8. Location if not on main campus: Al-Noor Specialist Hospital, Makkah, KSA
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	10
b. Blended (traditional and online)		percentage?	10
c. E-learning	√	percentage?	5
d. Correspondence		percentage?	
f. Other: Hospital Rounds	√	percentage?	75

Comments: Clinical placement in Clinical Biochemistry Laboratories in various affiliated hospitals whom having official partnerships with the Faculty of Medicine, UQU at Makkah regions

B- Objectives

The main objective of this course
Is to provide the student with the technical knowledge, technical skills to perform laboratory tests in the field of clinical chemistry as well as interpretative skills of the clinical chemistry laboratory data and communication skills with the referring clinicians:

- Acquire laboratory-generated data and perform statistical analyses within the framework of the scientific methods.
- Predict the outcome of laboratory exercises according to concepts, principles, and laws discussed in the course.
- Evaluate case studies by applying physiological principles on a molecular, cellular, organ, and systems level.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)
The training course will include all recent techniques in the major medical laboratories.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:
This course provides practical approach to all medical lab techniques. The course objectives are to:

- Provide a broad, modern knowledge and training in the theoretical and practical aspects of medical laboratories.
- Prepare students to collate, interpret and communicate lab results.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Lab safety, Quality Assurance, Specimen collection	1	8
Spectrophotometry, Fluorometry & Mass spectrophotometry	1	8
Electrophoresis and Competitive binding assays	1	8
Immunoassay techniques: ELISA, Chemiluminescence	1	8
Chromatography HPLC, GC, and TLC and AAS and separative techniques	1	8
Molecular biology techniques	1	8
Hormonal Assays	1	8
Point of care testing	1	8

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	8	8	40	8	0	64
	Actual						
Credit	Planned						4 CU
	Actual						

3. Individual study/learning hours expected for students per week. (8)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies			
On the table below are the five NQF Learning Domains, numbered in the left column. Curriculum Map			
Code #	**NQF Learning Domains And Course Learning Outcomes**	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Describes the various laboratory techniques	Interactive Lecture	Essays and MCQ
1.2	Introduce the principal of laboratory methods	Interactive Lecture	Essays and MCQ
1.3	Introduce safety and quality assurance methods	Interactive Lecture	Essays and MCQ
2.0	**Cognitive Skills**		
2.1	Identify lab skills	Group activity	Oral presentation
2.2	Distinguish the interpretation of lab results	Group activity	Oral presentation
2.3			
3.0	**Interpersonal Skills & Responsibility**		
3.1	Design experiments and to apply statistical analysis to laboratory data	Group activity	Oral presentation seminars
3.2	Literature searching/information retrieval and communication of their findings in written reports	Group activity	Oral presentation seminars. Research activities
3.3	Student-centred learning. Students are given time to work through all the topics covered	Group activity	Oral presentation seminars
4.0	**Communication, Information Technology, Numerical**		
4.1	IT skills training involving structure activity relationships and metabolism prediction	Task Based Learning	Oral presentation seminars about subject related to the course in groups. Research activities
4.2			
5.0	**Psychomotor(if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation	**Week Due**	**Proportion of Total Assessment**
1	Interactive activity during lectures		10 %
2	Completion of Lab activities, Log book		70%
3	Oral presentation		10%
4	Satisfactory performance/demonstration of learning objectives		10%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The lecturers involved in the course to be available for student consultations and academic advice.
- Course organizer and lecturers of the course are happy to answer all students' quires during or after the lectures, and they can be reached by personal meeting, phones or e-mails.
- Student representative usually have the mobile number of the lecturer to contact him in case of any queries.
- All students have the e-mail of the lecturer.

E Learning Resources

1. List Required Textbooks

- Clinical Chemistry, a laboratory perspective. By Wendey Arneson and Jean Brickell
- Tietz Fundamentals of Clinical Chemistry, Fifth Edition. Philadelphia, W. B. Saunders company, Burtis CA, Ashwood ER (ed.).
- Clinical Laboratory Diagnostics, Use and Assessment of Clinical Laboratory Results, Frankfurt/Main, TH-Books, Thomas, L.,
- Devlin, T. M. (ed.). Textbook of Biochemistry with Clinical Correlation, Fifth Edition, New York, Wiley-Liss.
- Clinical Chemistry.Theory, analysis, and correlation, Third Edition. St. Louis, Missouri, Mosby-Year Book Inc. Kaplan LA, Pesce AJ (ed.).
- Loeffler L. Biochemie und Pathobiochemie. 6 Aufl. Berlin, Springer,
- Clinical Chemistry. By William Marshall. Mosby-London.
- Clinical Chemistry: in Diagnosis & Treatment. By Philip D Mayne. Arnold-London
- Clinical Chemistry: Principle, Procedure, correlation. By Michael L Bishop. Lippincott- New York.
- Basic Medical Biochemistry: A Clinical Approach, By DB Marks, AD Marks, CM Smith. Williams & Wilkins- London.
- Davidson's Principles & Practice of Medicine, 18th edition-1999. By C Haslett, ER Chilvers, JAA Hunter, NA Boon. Churchill Livingstone

- List Essential References Materials (Journals, Reports, etc.)

8. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

- www.who.int
- www.wwfindia.org
- www.unep.org

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

Al-Noor Specialist Hospital Laboratory

- Faculty of Medicine Classroom

2. Technology resources (AV, data show, Smart Board, software, etc.) Data show, Smart Board, software
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) All Automated machine in the lab

G Course Evaluation and Improvement Procedures

6. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports.
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard curve
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice

Name of Course Instructor: Prof. Essam Nour Eldin & Dr. Altaf Abdulkhaliq & Dr. Hala Kamel & Dr. Abeer Ahmed ALrefai

Signature: **Date Completed: 20/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

Course Title: Elective Courses
Course Code: 1001601-2EL1
Course Code: 1001601-2EL2

Elective Courses

Course Code	Course Title	Credit Hours
	Bioinformatics in Medicine	2
	Laboratory Management	2
	Cancer Biomarkers	2
	Biomarkers in Inflammatory Diseases	2
	Clinical Nutrition	2
	Point of Care Testing	2
	Biochemical and Clinical aspects of Muscle Exercise	2
	Bio-neurochemistry in Medical Laboratory	2
	* These are examples of elective courses; More courses will be added through implementation of the program.	

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Cancer Biomarkers
Course Code:

Date: 1/11/2018	**Institution:** Umm Al Qura University
College: Medicine	**Department: Biochemistry**

A. Course Identification and General Information

1. Course title and code: Cancer Biomarkers				
2. Credit hours: 2				
3. Program(s) in which the course is offered. MSc Clinical Biochemistry				
4. Name of faculty member responsible for the course: **Dr. Saleh A. Saleh**				
5. Level/year at which this course is offered: Post graduate				
6. Pre-requisites for this course (if any): --				
7. Co-requisites for this course (if any): --				
8. Location if not on main campus: --				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	√	percentage?	80%	
b. Blended (traditional and online)		percentage?		
c. E-learning		percentage?		
d. Correspondence		percentage?		
f. Other	√	percentage?	20%	

Comments: 20% laboratory work

B- Objectives

1. The main objective of this course

This course focuses on the importance cancer biomarkers as well as provides students with an in-depth approach to the molecular biochemistry of cancer. Multiple types of cancer biomarkers, including breast, ovarian, colon, lung, prostate and bladder, will be explored through a series of lectures, practical application and evaluation of molecular approaches to tumor markers as well as hands-on tutorials that will cover concepts of cancer biology, alterations in cell cycle machinery, development and progression, tumor suppressors and oncogenes. In addition, genetics and relevant signal transduction pathways of cancer are highlighted. The tutorials include application of different molecular diagnostic techniques, state of the art analysis of cancer biomarkers and critical thinking skills will be developed in the critical analysis and interpretation of complex analysis results of screening, monitoring and follow-up cancer patients.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The tutorials will be introduced as a small group discussion to develop critical thinking skills in either in the critical analysis and interpretation of results.

Students will gain hands on applications and state-of-the-art different analytical techniques of cancer biomolecules

C- Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to cancer biology	1	2
Biochemical and molecular approaches to the cancer diagnosis	1	2
Cancer biomarkers: - Definition, types and classification - Prognostic, predictive and pharmacodynamic markers	1	2
Potential clinical uses of cancer biomarkers - Characteristics of Ideal tumor marker - Risk assessment - Screening for early detection - Diagnosis - Prognosis - Selection of Tumor marker and monitoring of cancer therapy	3	6
Discovery and validation of cancer biomarkers - Preclinical exploratory Studies - Clinical assay development - Retrospective longitudinal repository studies - Prospective screening Studies - Cancer control studies	2	6
Novel cancer biomarkers: - Success and failure	1	2
Tumor markers of selected cancers: - Breast, ovarian, GIT, prostate and bladder cancers	3	9

Prognostic and predictive biomarkers: - Tools in personalized oncology	1	2

2. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact Hours	Planned	10	10	8	2		30
	Actual						
Credit	Planned	0.7	0.7	0.5	0.1		2
	Actual						

3. Individual study/learning hours expected for students per week. (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course students will be able to:		
1.1	- Know and understand the essential facts, terminology, classification systems, major concepts, principles and theories of biomarkers. - Gain an awareness and understanding of current developments of tumor markers and the applications arising out of them. - Understand the methods of acquiring, interpreting and analyzing biological information. - Gain knowledge of a range of practical and presentation techniques and methodologies. - Be knowledgeable about cancer diagnostic and management as well	- Provide clear and informative lecture notes with learning objectives that focus on important points. - Give clear, informative, and stimulating lectures to enhance the learning experience for students. - Answer questions either in or outside class or via e-mail. - Compose thoughtful and fair exam questions that assess student learning and application of the course content. - Directing the case sessions and facilitators to provide an effective learning experience in small group, team-oriented sessions. - Providing answers and explanations to student inquiries regarding any aspect of the course.	Compose thoughtful and fair assessment tasks that assess student learning and application of the course content including - Essay - Periodical tests - Oral presentation - Group project - Final examination

	as their relation to clinical biochemistry.	- Providing advice and assistance to students for improving their learning strategies and performance in the course. - Reviewing and implementing appropriate changes in the course based on student feedback and evaluations.	
2.0	**Cognitive Skills:** The course has an aim to improve the ability in the following cognitive Skills		
2.1	- Effective Learning skills - Problem solving skills. - Self-assessment and development. - Reading and searching	- Introductory lecture gives an overview of the content and significance of the course and of its relationship to students' existing knowledge. - Each subsequent lecture begins with a similar overview linking the particular content of the presentation to the general overview. - Tutorials review the content of each lecture and clarify any matters not understood. - Each lecture has pop-quiz of the content and specific information, to assess the interaction between students and lecturer. - Each lecture introduced with the aim of multimedia facilities, power point animations, movies, etc. - Individual assignments require use of library reference material and web sites to identify information required to complete tasks.	- Improvement in the overall performance of the student in consequent examinations during the course. - Interaction of the course and its effect on other courses offered for the students, which can be measured by their feedback.
3.0	**Interpersonal Skills & Responsibility**		
3.1	**The course aims to improve the ability in the following**	**Students are expected to:** - Use all available resources to	These skills are reflected on the student behavior inside and outside the class. It can be assessed

	interpersonal skills and responsibilities: - Productive effective and interactive discussion skills. - Following the learner manners and ethics including; commitment, respect and communication with confidence.	accomplish the learning objectives in each lecture and case-based discussion and exercise session, including: a. Attending all lecture and case-based discussion sessions. b. Reading textbook assignments. c. Participating in lecture and case sessions by answering questions posed in class and asking questions when information is unclear or more information is needed. d. Performing assigned exercises working individually or in groups, as directed. e. Submitting completed assignments on or before the stated deadlines for timely feedback. f. Optimizing their learning strategies by trying the suggested "tips" and/or other ideas and working with others. g. Asking for help from the course manager when they need it or even think they might need it. - Notify the course manager as soon as they can if they are seriously ill or have an emergency that prevents them from attending the case sessions or an exam. - Provide constructive feedback regarding the course on evaluation forms that will be	by the feedback from the lecturer regard the student's interaction and behavior.

		provided at the end of the semester. - Adhere to the faculty academic and professional rules.	
4.0	**Communication, Information Technology, Numerical**		
4.1	The course aims to improve the ability in the following Information Technology and Numerical Skills: - Using the comport programs for submitting assignments and designing presentations. - Enhance the ability to use the search engines. - Support the study with visual memory using the medical animations related to the course.	- Refer the students to websites links containing texts and content related to the given lecture that may help them for more understanding. - Stimulate the student to arise questions during the lectures and look for the answers in the books or websites or search engines.	Those skills can be predicted by: - The performance in examination can reflect the level of understanding. - The style and the level of the projects and assignments instructed.
5.0	**Psychomotor (if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
The student has the right to contact the lecturer or coordinators by their e-mails or during their office hours for academic advices or consultations.

E Learning Resources

1. List Required Textbooks - Biomarkers in Cancer, Preedy VR and Patel V (Ed), Springer 2015, ISBN 9789400776821 - Advances in Cancer Biomarkers, Scatena R (Ed), Springer 2015, ISBN 9789401772150 - Cancer Biomarkers: Minimal and Noninvasive Early Diagnosis and Prognosis, Barh Det al., (Ed), CRC Press 2014, ISBN-13: 978-1138076808 - Cancer Biomarkers, Georgakilas AG (Ed), CRC Press 2012, ISBN 9781578087617
2. List Essential References Materials (Journals, Reports, etc.) - Journal of clinical Chemistry - Annals of Biochemistry - Cancers
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. www.cancer.org www.aacc.org
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Auditoriums - Laboratory
2. Technology resources (AV, data show, Smart Board, software, etc.) - Audio-visual equipment for teaching (projector, microphones, speakers, board)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - Evaluation questionnaires of the staff at the end of the course
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development - Reviewing and implementing appropriate changes in the course based on the student feedback and evaluations
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. - Regular meeting to the staff to review the course effectiveness

Name of Course Instructor: Dr. Saleh Ahmed Saleh

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Clinical Nutrition

Date: 20/10/2018	**Institution:.Umm Al Qura University**
College: Faculty of Medicine	**Department: Biochemistry**

A. Course Identification and General Information

1. Course title and code: **Clinical Nutrition** 1001601-2CN			
2. Credit hours: **(2 credit hours)**			
3. Program(s) in which the course is offered. **MSc of Clinical Biochemistry** (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course **Prof. Essam Nour Eldin**			
5. Level/year at which this course is offered: **Postgraduate Degree (MSc)**			
6. Pre-requisites for this course (if any): ---			
7. Co-requisites for this course (if any):----			
8. Location if not on main campus:			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage?	90
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	10
d. Correspondence		percentage?	
f. Other	√	percentage?	
Comments:			

B- Objectives

The main objective of this course
As nutrition is of central importance to the treatment of various diseases and health conditions, so in this course the student will study the importance of nutrition and a healthy diet, especially in hospital settings, since malnutrition is a widely presented problem and an appropriate dietary plan can shorten the treatment period and hence the duration of a patient's hospitalization. .

Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Regular feedback at the end of conducting this course will be performed according to the quality standards with determination of all points of improvement followed by clear action plans including all components of the course (curriculum, teaching methods, and assessment methods).

Case based seminars- Presentations

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is essential for health professionals who are involved in the general medical treatment of patients. The course will be in the form of questions and answers, in order to be more interesting and practical for the student. The course includes short answers on topics related to different scientific fields of nutrition, based on the recent literature, and can be used as a scientific tool for all professionals in daily practice. Most topics of the course will be covered through lectures and tutorials, other will be covered through practical approach.

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

- Recognize the roles of diets and nutrition in the treatment of patients.
- Identify the different strategy of nutritional assessment and support.
- Recognize the proper nutrition aspects of the most prevalent diseases.

Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
Principals of Healthy Nutrition	1	2
Nutritional Assessment and Malnutrition		2
Weight Management and Eating Disorders	1	2
Nutrition in Diabetes		2
Nutrition in Cardiovascular and pulmonary diseases	1	2
Nutrition in Gastrointestinal and renal Diseases		2
Seminar, Tutorial and Clinical Diagnostic Lab	1	2
Nutrition and Anaemias		2
Nutrition and Neoplastic Diseases	1	2
Nutrition in Rheumatic and Neurological Diseases		2
Enteral Nutrition	1	2
Parenteral Nutrition		2
Food Allergy	1	2
Drug – nutrient interactions		2

9. Course components (total contact and credit hours per semester):							
		Lecture	**Tutorial**	**Laboratory/ Studio**	**Practical**	**Other**	**Total**
Contact Hours	Planned	**13**	**1**		**-**		**28**
	Actual			**--**	**--**	**-**	**-**
Credit	Planned						**2 CU**
	Actual						

3. Individual study/learning hours expected for students per week (4)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.
Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	▪ Clinical Aspect of Nutrition	Interactive lecture	Written Single Best Answer (SBA) Objective Structured Practical Exam (OSPE)
1.2	▪	Interactive lecture	Written Single Best Answer (SBA)
2.0	**Cognitive Skills**		
2.1			
3.0	**Interpersonal Skills & Responsibility**		

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- All scientific materials of the course will be offered by high qualified academic members of professional capabilities and interest to react with the students.
- The course instructor of the course is a full-time academic doctor in the Biochemistry department in faculty of medicine.
- Office hours for all staff members will be scheduled and distributed to all candidates under the supervision and approval of the head of the department.
- Electronic contacts will be established for coordination and scientific assistance including Email, DROPBOX, Google drive, WhatsApp group.

E Learning Resources

1. List Required Textbooks

- Clinical Nutrition in Practice. A John Wiley & Sons, Ltd., Publication
- Clinical Nutrition by Leah Coles. ISBN: 9781926895970.
- Dietary Supplements in Health Promotion by Taylor C. Wallace (Editor) ISBN: 9781482210347
- Foods and Dietary Supplements in the Prevention and Treatment of Disease in Older Adults by Ronald Ross Watson (Editor). ISBN: 9780124186804
- Handbook of Clinical Nutrition and Aging by Connie Watkins Bales (Editor); Christine S. Ritchie (Editor). ISBN: 9781603273848
- Handbook of Drug-Nutrient Interactions by Joseph I. Boullata (Editor); Vincent T. Armenti (Editor) . ISBN: 9781603273633
- Modern Nutrition in Health and Disease, 11th ed by Shils; Katherine L. Tucker; Benjamin Caballero; Robert J. Cousins; A. Catharine Ross; Thomas R. Ziegler. ISBN: 9781605474618

List Essential References Materials (Journals, Reports, etc.)

- American Journal of Clinical Nutrition
- Clinical Nutrition
- Clinical Nutrition. Supplements.
- Current Opinion in Clinical Nutrition & Metabolic Care
- Diabetes Care
- ICAN: Infant, Child, & Adolescent Nutrition
- JAMA : the Journal of the American Medical Association
- Journal of Nutrition
- Journal of the Academy of Nutrition and Dietetics (formerly Jour. of the Amer. Dietetic Assn.)
- Journal of the American Dietetic Association
- JPEN: Journal of Parenteral and Enteral Nutrition
- Lancet
- NEJM: New England Journal of Medicine
- Nutrition in Clinical Practice
- Nutrition Today
- Today's Dietitian
- More Diet & Clinical Nutrition Journals

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Traditional Classrooms in faculty of Medicine. - Meeting room of biochemistry department for oral presentations.
2. Technology resources (AV, data show, Smart Board, software, etc.) - Essential technology resources are available in the faculty of medicine including (Smart board, data show, Internet access in presentation room)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

2. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching ▪ All quality standards mentioned and required for accreditation will be performed during and at the end of the course including well-constructed student opinion- surveys for all components of the course including effectiveness of: teaching (methods, staff), assessment, schedule, course guide
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department ▪ The teaching process will be evaluated through both computer-based surveys for students and regular feedback from staff members by the end of each lecture/lab through evaluation form. ▪ The instructor of the course will be responsible for gathering all feedback comments from stakeholders and all results of surveys form Allstakeholders (Staff and student), then analyze and determine all weak and strength points in the course. ▪ All results and suggested action plans will be evaluated through the higher committee of the program for approval.
4. Procedures for Teaching Development ▪ The instructor of the course will be responsible for performing student opinion surveys concerning teaching process, gathering the results, analyzing and determining all weak and strength points in the teaching process in the course, suggesting the action plans. ▪ Survey results and suggested action plans will be evaluated through the higher committee of the program for approval.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) ▪ All results of the students will be overall evaluated using Bell curve-chart. ▪ Independent evaluation of the exam , assignments, random student-answers along with the model answer to internal and external reviewers for evaluation.

- The internal reviewer will do the blind second marking of the selected sample and submits the grades and a report to the instructor.
- Furthermore, external verification of achievements will be performed by bench marking of the course results with the other courses in the program and with other external potential comparable -programs offered for postgraduates.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- The instructor of the course will be responsible for gathering all feed back comments from stakeholders and all results of surveys form stakeholders (Staff and student), then analyze and determine all weak and strength points in the course, suggesting the action plans.
- The ratio of students selected the programs over three years will be recorded (curve)in addition to the ratio of attendance for sessions.
- The suggestions and the action plans will be presented to the consultation committee and the higher administrative program-committee for evaluation and suggestions for implementation of such plans in the curriculum map of the program.
- All suggested action plans and implementation protocol will be presented to the department council for approval.

Name of Course Instructor: **Prof Essam Nour Eldin**

Signature: **Date Completed:** **7/11/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS

Form

Course Title: Laboratory Management

Date: 20- 10-.2018....	**Institution:** Umm Al Qura University
College: Faculty of Medicine	**Department:** Biochemistry.

A. Course Identification and General Information

1. Course title and code: **Laboratory Management**
2. Credit hours: **2**
3. Program(s) in which the course is offered. Clinical Biochemistry Master Degree
4. Name of faculty member responsible for the course **Dr. Hala Kamel**
5. Level/year at which this course is offered: Postgraduate
6. Pre-requisites for this course (if any): Graduate degree from appropriate and recognized college of applied medical sciences or pharmacy or medicine or equivalent.
7. Co-requisites for this course (if any):
   G. The student should have overall grade "Good" in bachelor and "very good" in Biochemistry courses in undergraduate study.
   H. Evidence of English exam satisfaction
8. Location if not on main campus: Biochemistry Departments
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	70
b. Blended (traditional and online)	√	percentage?	10
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other: PBL		percentage?	20

Comments:

B- Objectives

1. The main objective of this course
   - The overall objective of this course of the master degree is developing a comprehensive understanding of management of laboratories in general and focus on the applications on Clinical Biochemistry labs. Running a lab poses many challenges, including managing people, projects, and budgeting and establishing workplace practices that encourage productivity, safety, ethics, and high employee morale.
   - This course is expected to provide students with an introduction to the concept, basic knowledge, and practice of management in clinical laboratories focusing on clinical biochemistry laboratories. Specifically, it will provide students with four basic management functions: planning, organizing, leading, and controlling so that providing quality laboratory services as effectively and efficiently as possible; with discussion of available resources of the lab including personnel, equipment، money, time and space that would help for decision-making.

   The specific objectives of this course to:

   1. To give students an overview of basic management principles and practices in clinical laboratories focusing in clinical biochemistry labs.
   2. To define relevant economic issues that influence the delivery of healthcare services and their significance to the practice of laboratory medicine
   3. To describe methods for recruiting and retaining laboratory staff and importance of training and continuous assessment of their performance.
   4. To discuss benefits and needs for accreditation and licensure in practice considering international and national agencies, emphasizing on Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI).
   5. To apprise the process of total quality management (TQM) , audits , documentation and records of laboratories
   6. To addresses the importance in ethics of the profession, and acceptable practice emphasizing the importance of communication skills.
   7. To discuss establishment process and procedure of Laboratory Information System (LIS).
   8. To discuss the process of selection and implementation of new equipment and procedures
   9. To apprise the importance of implementation of lab safety management plan and emergency management.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)
   1) They will deal with electronic books in the field, as they are using now many web-based reference materials.
   2) Activation of self-learning through assignments and activities as presentation and problem-solving discussion sessions.
   3) Research project for selected up-to-date topics that recently apply in laboratory management and not covered in the course
   4) Updating of contents is a continuous process for the course.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
1. Principles of laboratory management - Basic principles and practice - Management Functions: planning, organization, directing, implementation and controlling - Management practice: policy, staff, facilities, equipment, procedures, documentation, records, quality control, finance, audit.	1	2
2- **Management and leadership** - Distinguishing Management from Leadership - Leadership approach and teamwork - Leadership styles and management theories - Conflict management; step-by-step approach to problem solving	1	2
3- Quality management system - 12 essential components of Quality management system model for health care (CLSI/NCCLS) - Assessment tools for examining laboratory performance - Quality Management of Pre-analytical post analytical and analytical Processes. - Statistical tool for quality management	4	6
4- International & National laboratory standards and Accreditations - Regulatory/accrediting agencies, standards and regulations - Overview of CAP, ISO 15189, JCAHO, NAACLS, CLIA, - Regulations of Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI). - Internal and external audit.	2	4
5- Budgeting and inventory management - Analyzing needs and Consumption-based quantification - Maintenance - Verification & Validation and proficiency testing of new instruments, kits and methods	1	2
6- Human Resources & personal - Recruitment and orientation - Elaboration of laboratory time table, schedule, and duty - Competency and competency assessment - Training and continuing education - Communication skills written, spoken and action - - Communication with patients and other health care providers	2	4
7-laboratory information systems & documentation - Information management system and efficient data management - Ensuring the accessibility, accuracy, timeliness and security of data؛ - Providing confidentiality and privacy of patient information - Documentation and time keeping records of laboratories	2	4

9- Workflow & facilities - designing a laboratory and organizing workflow - Standard laboratory safety practices - Laboratory waste management - Risk identification of hazards - Patient's safety	1	2

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	PBL	Other	Total
Contact Hours	Planned	15	10		10		45
	Actual						
Credit	Planned	1	0.5		0.5		2
	Actual						

3. Individual study/learning hours expected for students per week (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	- To outline basic management principles and practices in clinical laboratories focusing in clinical biochemistry labs	▪Lectures ▪IL ▪Tutorials ▪self -study activities : for assigned questions with answers and review ▪ PBL session	-Written exam -Single Best Answer (SBA) are constructed through blue print as : ▶15% knowledge ▶45% Analysis and cognitive ▶40% interpretation and problem solving
1.2	- To define relevant economic issues that influence the delivery of healthcare services and their significance to the practice of laboratory medicine		
1.3	- To describe methods for recruiting and retaining laboratory staff and importance of training and continuous assessment of their performance.		
1.4	- To discuss benefits and needs for accreditation and licensure in practice considering international and national agencies,		
2.0	**Cognitive Skills**		
2.1	- Describe the role of laboratory in the health care activities	▪Lecture ▪Interactive lectures ▪Tutorials; using group discussion and problem solving.	--Written exam --Single Best Answer (SBA) are constructed through blue print as :
2.2	- - Elaborate the essential steps followed in the management		
2.3	- Describe the facilities and safe design of laboratories		

2.4	- State the guidelines for effective communication	▪Whole group and small group discussion, debate and analysis of case scenarios beside small group work. ▪PBL	▶15% knowledge ▶45% Analysis and cognitive ▶40% -interpretation and problem solving
2.5	- discuss the process of selection and implementation of new equipment and procedures		
2.6	- To apprise the importance of implementation of lab safety management plan and emergency management.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	- Appraise a team working environment in laboratories	▪Group discussion for PBL : students try to discuss in groups how to reach the final decision of solution for problems ▪Role-play exercise on controversial issue relevant to the course based on a case study, with discussion in tutorial of appropriate responses and consequences to individuals involved.	▪Assessment of group assignment t for individual contribution to the group task. ▪Group and individual assignments and problem solving skills Seminar
3.2	- Explain how to manage time and space		
3.3	- Prepare a laboratory time table, schedule, and duty rosters		
3.4	- Discuss how to arrange work space and work flow		
3.5	- Manage equipment and laboratory supplies		
3.6	- Explain how to order, issue, store and control laboratory chemicals and equipment		
4.0	**Communication, Information Technology, Numerical**		
4.1	- Elaborate the various communication skills needed in the laboratory	▪IL ▪Discussions in the tutorial and PBL. ▪Group assignments	▪Group assessment for reports ▪Assignment assessment ▪Discussions in the tutorial sessions. ▪Group and individual Presentation
4.2	- Implement efficient laboratory Information system		
4.3	- Use data and information to guide decisions and to understand variation in the performance of processes supporting safety and quality		

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation	Week Due	Proportion of Total Assessment
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %

6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- The teaching staffs involved in the course are available for student consultations and academic advice at the assigned office hours of each staff member.
- Course organizer and teaching staffs of this course are happy to answer all students' quires during and after the teaching activities.
- The student leader usually has the mobile number of the teaching staffs and allows contacting him in case of any queries.
- All students have the all available contact information of teaching staffs.

E Learning Resources

- 1. List Required Textbooks
- Clinical Laboratory Management (second edition)2014, Lynne S. Garcia, editor in chief, LSG & Associates, Santa Monica، CA ; editors, Paul Buchner; Library of Congress Cataloging-in-Publication Data
- Laboratory Quality Management System Handbook, World Health Organization (2011), WHO Library Cataloguing-in-Publication Data; on line WHO web site <http://www.who.int/about/licensing/copyright_form/en/index.html>
- Health Laboratory Management and Quality Assurance(2004) Endris Mekonnen Gondar University College In collaboration with the Ethiopia Public Health Training Initiative, The Carter Center،the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education
- Essentials of Clinical Laboratory Management in Developing Regions (2008); Wim de Kieviet, Elizabeth Frank, Herbert Stekel, Committee on Clinical Laboratory Management (C-CLM); Education and Management Division (EMD)IFCC

On line www.ifcc.org/media/185572/2008%20-%20C-CLM%20Monograph.pdf

2. List Essential References Materials (Journals, Reports, etc.)
https://www.medlabmag.com/
www.who.int/ihr/publications/lqms_en.pdf

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
https://bohatala.com/medical-laboratory-management-system/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) Faculty of Medicine Classroom, Biochemistry Departments labs, Al-Noor hospital lab (Visit)
2. Technology resources (AV, data show, Smart Board, software, etc.) Data show, Smart Board, software
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • University student's feedback about the course. • Discussion of standard course evaluation questionnaire.
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Open discussions with the students • Student feedback. • Study and discussion of reports
3. Procedures for Teaching Development • Feedback of improved teaching methods from students and colleagues • Review of recommended teaching strategies • Put and flow the up to date strategies to develop the course
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard methods of evaluation • Assigned exam committee form Biochemistry department to check control the double check of all exam and results process • Assigned staff member reviewers for student's projects and activities not involved in the teaching the topic of activities
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. • Student questionnaire about the effectiveness of the course in their practice • Feedback from teaching staffs who's involved in the teaching process and taking in consideration their suggestions to develop this course. • Analysis and evaluation of examination results every exam by course committee of the department. • Reviewing system and time-table and the staff activities after analysis of results • The course will be revised annually again after its delivery considering students' results of and the results of the course evaluation questionnaire by both students and teaching staff. • The course director or committee will discuss these issues and put an improvement plan for each spotted problem, accordingly revise the course content and intended learning objectives

Name of Course Instructor: Dr. Hala Kamel

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS

Form

Course Title: Biochemical & Clinical Aspects on Muscle Exercise

Date: 20/10/2018	**Institution: Umm Al Qura University**
College: Faculty of Medicine	**Department Biochemistry**

A. Course Identification and General Information

1. Course title and code: Skeletal Muscle Biochemistry (Metabolic and Clinical correlated Aspects)
2. Credit hours:(2)
3. Program(s) in which the course is offered. MSc of Clinical Biochemistry
(If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course Dr. Amr Ahmed Amin
5. Level/year at which this course is offered: Postgraduate Degree (MSc)
6. Pre-requisites for this course (if any): ---
7. Co-requisites for this course (if any):----
8. Location if not on main campus:
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	60
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other	√	percentage?	40

Comments:
Six contact hours including two laboratory sessions will be offered by both anatomy and physiology departments in the faculty of medicine.

B- Objectives

The main objective of this course

- To provide basic and applied biochemical knowledge of skeletal muscles and Exercise performance.
- To provide the principles of biochemical aspects underlying the correlated clinical disorders.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- Regular feedback at the end of conducting this course will be performedaccording to the quality standards with determination of all points of improvement followed by clear action plansincluding all components of the course (curriculum, teaching methods, and assessment methods).

Case based seminars- Presentations

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is designed to:

- Provide basic and applied knowledge in skeletal muscle structure, energetics, and classification; integrating this knowledge to the practice of physical exercise of athletes and weight reduction for obese.
- Discuss the effects of oral amino acids, creatine as well as injected anabolic hormones on health of athletes.
- Provide a clear description of different metabolic disorders affecting skeletal muscles including molecular mechanism of fatigue, metabolic myopathy, toxic and drug-induced myopathy as well as muscle atrophy.

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

- Recognize the anatomical / cellular structure of skeletal muscles and the mechanism of contraction/relaxation.
- Identify the different routes of sk. muscle energy; creatine, Fatty acids, lactate, Glucose
- Explain the different metabolic fuel requirements for a sprint and for a marathon.
- Discuss the effect of different types of physical exercises on sk. muscles, recognizing the effect of amino acids, creatine, anabolic on the health status of athletes.
- Describe the metabolic disorders of sk. Muscles including muscle atrophy, types of metabolic myopathies, and toxic myopathy, illustrating the biochemical markers in case of muscle injury.
- Recognize the biochemical principles underlying the weight management in case of obesity and hypertension using physical exercise.

Topics to be Covered		
List of Topics	**No. of Weeks**	**Contact hours**
1. Skeletal Muscle structure, biochemical features (an introduction on muscle amino acids, proteins, enzymes, pH and antioxidants). 2. Molecular mechanisms of sk. muscle contraction and relaxation.	1	2

3.	Overview of anatomy/histology of sk. muscles.	1	2
4.	Overview of physiology of sk. Muscles: the electrodiagnostic medicine technique for evaluating and recording the electrical activity produced by skeletal muscles (EMG technique)	1	2
5.	Muscle energetics and high-energy phosphates	1	2
6.	Applied skeletal muscle classification and metabolic criteria: analysis and techniques used for measurement of the muscle fiber type composition. The biochemical determinants of muscle force and power.	1	2
7.	Physical exercise and skeletal muscle adaptation: and the effect of amino acids, creatine, and anabolics (benefits and harms)	1	2
8.	Muscle stress and clinical metabolic correlations: Biochemical Aspects of Peripheral Muscle Fatigue, muscle atrophy, metabolic myopathy (GSDMcArdle / mitochondrial myopathy/ toxic myopathy as statin-colchicine-steroids	1	2
9.	Biochemical investigations of muscle injury: including various diagnostic biochemical tools e.g urinalysis and blood analysis in the different disease modalities including rhabdomyolysis, metabolic myopathies, defects of glycogen metabolism, and defects of mitochondrial oxidation.	1	2
10.	Role of physical exercise in controlling obesity and hypertension (HTN): Biochemical principals of physical exercise performance in case of controlling obesity and hypertension (HTN).	1	2

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	14	4	4	-	2	24
	Actual			--	--	-	-
Credit	Planned	1.2	0.32	0.32		0.16	2 CU
	Actual						

3. Individual study/learning hours expected for students per week. (3)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	▪ Recognition of the anatomical / cellular structure of skeletal	Interactive lecture Laboratory session	Written Single Best Answer (SBA)

	muscles (sk) and the mechanism of contraction/relaxation.		Objective Structured Practical Exam (OSPE)
1.2	▪ Identification of the different routes of sk. muscle energy.	Interactive lecture	Written Single Best Answer (SBA)
2.0	**Cognitive Skills**		
2.1	Explain the metabolic effect of different types of physical exercises on sk. Muscles.	Interactive Lecture	Written Single Best Answer (SBA) Oral presentation.
2.2	Discuss the effect of amino acids, creatine, and anabolic for athletes.	Interactive Lecture	Written Single Best Answer (SBA) Oral presentation.
3.0	**Interpersonal Skills & Responsibility**		
3.1	▪ Analyzing the different metabolic disorders that limit exercise performance.	Interactive Teaching	Written Single Best Answer (SBA)
3.2	▪ Demonstration of Biochemical principals underlying physical exercise-performance to control obesity and hypertension.	Case based Learning (CBL) Seminar	Written Single Best Answer (SBA)
4.0	**Communication, Information Technology, Numerical**		
4.1	▪ Interpretation of the correlations between metabolic disorders and the biochemical investigations.	Problem based learning (PBL).	Written Single Best Answer (SBA) Oral presentation
5.0	**Psychomotor (if any)**		
5.1	▪ Applying of scientific knowledge in developing physical training protocol to control obesity and HTN.	Case based learning (CBL)	Single best answer (SBA) and oral presentation).

5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation	Week Due	Proportion of Total Assessment
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

- All scientific materials of the course will be offered by high qualified academic members of professional capabilities and interest to react with the students.
- The course instructor of the course is a full-time academic doctor in the Biochemistry department in faculty of medicine.
- Office hours for all staff members will be scheduled and distributed to all candidates under the supervision and approval of the head of the department.
- Electronic contacts will be established for coordination and scientific assistance including Email, DROPBOX, Google drive, WhatsApp group.

E Learning Resources

1. List Required Textbooks

- Peter J. Kennelly; Robert K. Murray, 2014:Harper's Illustrated Biochemistry,Chapter51: Muscle & the Cytoskeleton.
- John Baynes Marek Dominiczak, 2018: Medical Biochemistry, 5th Edition, Chapter 37: Muscle: Energy Metabolism and Contraction Exercise

List Essential References Materials (Journals, Reports, etc.)

- William J. Marshall, Marta Lapsley,Ruth M. : Clinical Biochemistry: Metabolic and Clinical Aspects, CHAPTER 33 - Muscle disease
- David Jones; Joan Rounds; Arnold De Haan, 2004: Skeletal Muscle: A Textbook of Muscle Physiology for Sport, Exercise and Physiotherapy 2/9, 9/91
- Victor Dubowitz, Caroline A. Sewry, and Anders Oldfors: Muscle Biopsy: A Practical Approach, e-book, 4th edition, chapters 16, 17, 18, 19, and 20
- J. Hywel Thomas and Brian Gillham 1989, 2nd Edition: Wills' Biochemical Basis of Medicine, 2nd edition, Muscle chapter 31, 375-387
- Robert James Thomas, Stacey A Kenfield, and Alfonso Jimenez, 2017: Exercise-induced biochemical changes and their potential influence on cancer: a scientific review, Br J Sports Med. ; 51(8): 640–644. SID
- K.S.Adedapo, O.M.Akinosun1, G.O.Arinola1, Bola OdekunleOdegbemi, O.I.Adedeji, 2009: Plasma Biochemical Changes During Moderate and Vigorous Exercises, International Journal of Sports Science and Engineering, Vol. 03 (2009) No. 02, pp. 073-076
- R A Moore. Evidence-based clinical biochemistry. Ann Clin Biochem (1997) 34: 3-7
- Jonathan Berg and Vanessa Lane. Pathology Harmony; a pragmatic and scientific approach to unfounded variation in the clinical laboratory. Ann Clin BiochemVolume: 48(3), 195-197
- Patrick M. Bossuyt; Johannes B. Reitsma; David E. Bruns; Constantine A. Gatsonis; Paul P. Glasziou; Les M. Irwig; David Moher; Drummond Rennie; Henrica C.W. de Vet; Jeroen G. Lijmer. The STARD Statement for Reporting Studies of Diagnostic Accuracy: Explanation and Elaboration. Ann Intern Med. (2003);138: W1–12
- Andrew C. Don-Wauchope, John L. Sievenpiper, Stephen A.Hill, Alfonso Iorio. Applicability of the AGREE II Instrument in Evaluating the Development Process and Quality of Current National Academy of Clinical Biochemistry Guidelines. Clinical Chemistry vol. 58: iss 10 (Oct 2012)

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. • Skeletal Muscle Journal, BMC, open access (IF(3.7), https://www.springer.com/life+sciences/cell+biology/journal/13395 • British Journal of Sports Medicine (BJSM) IF(7,8),https://bjsm.bmj.com/ • Sports Medicine journal IF(7.0), https://link.springer.com/journal/40279
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Traditional Classrooms in faculty of Medicine. - Labs of Anatomy and physiology departments, faculty of Medicine. - Meeting room of biochemistry department for oral presentations.
2. Technology resources (AV, data show, Smart Board, software, etc.) - Essential technology resources are available in the faculty of medicine including (Smart board, data show, Internet access in presentation room,..)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) ▪ Highly equipped Anatomy labs are available with 3D simulation center and models. ▪ Physiology labs with equipments for body measurements (BMI, fat %, …)are available. ▪ Electromyogram (EMG) equipment and the equipment for body mass index and analysis are required. ▪ Free WIFI access will be requested for all places allocated for the teaching.

G Course Evaluation and Improvement Procedures

3. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching ▪ All quality standards mentioned and required for accreditation will be performed during and at the end of the course including well-constructed student opinion-surveys for all components of the course including effectiveness of: teaching (methods, staff), assessment, schedule, course guide
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department ▪ The teaching process will be evaluated through both computer-based surveys for students and regular feedback from staff members by the end of each lecture/lab through evaluation form. ▪ The instructor of the course will be responsible for gathering all feedback comments from stakeholders and all results of surveys form Allstakeholders (Staff and student), then analyze and determine all weak and strength points in the course. ▪ All results and suggested action plans will be evaluated through the higher committee of the program for approval.
5. Procedures for Teaching Development ▪ The instructor of the course will be responsible for performing student opinion surveys concerning teaching process, gathering the results, analyzing and

determining all weak and strength points in the teaching process in the course, suggesting the action plans. ▪ Survey results and suggested action plans will be evaluated through the higher committee of the program for approval.
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) ▪ All results of the students will be overall evaluated using Bell curve-chart. ▪ Independent evaluation of the exam, assignments, random student-answers along with the model answer to internal and external reviewers for evaluation. ▪ The internal reviewer will do the blind second marking of the selected sample and submits the grades and a report to the instructor. ▪ Furthermore, external verification of achievements will be performed by bench marking of the course results with the other courses in the program and with other external potential comparable -programs offered for postgraduates.
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. ▪ The instructor of the course will be responsible for gathering all feed back comments from stakeholders and all results of surveys form stakeholders (Staff and student), then analyze and determine all weak and strength points in the course, suggesting the action plans. ▪ The ratio of students selected the programs over three years will be recorded (curve)in addition to the ratio of attendance for sessions. ▪ The suggestions and the action plans will be presented to the consultation committee and the higher administrative program-committee for evaluation and suggestions for implementation of such plans in the curriculum map of the program. ▪ All suggested action plans and implementation protocol will be presented to the department council for approval.

Name of Course Instructor: **Dr. Amr Ahmed Amin**

Signature: **Date Completed:** **20/10/2018**

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Biomarkers of Inflammatory Diseases

Date: 20....-.....-.....	**Institution:**...UQU.....
College:.....Medicine.....	**Department:**.....Biochemistry.....

A. Course Identification and General Information

1. Course title and code: Biomarkers of Inflammatory Diseases
2. Credit hours: 2
3. Program(s) in which the course is offered. MSc Clinical Biochemistry
4. Name of faculty member responsible for the course: Dr. Mahmoud Zaki El-Readi
5. Level/year at which this course is offered: Post graduate
6. Pre-requisites for this course (if any):
   - Graduate degree from appropriate and recognized college of applied medical sciences or pharmacy or medicine or equivalent.
7. Co-requisites for this course (if any):
   - The student should have overall grade “Good” in bachelor and “very good” in Biochemistry courses in undergraduate study.
   - Evidence of English exam satisfaction
8. Location if not on main campus: Biochemistry Departments
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	60%
b. Blended (traditional and online)	√	percentage?	10%
c. E-learning	√	percentage?	10%
d. Correspondence		percer	
f. Other	√	percentage?	20%

Comments:

- **Lectures**: The course runs for 12 weeks. The morning session includes lectures that would like to highlight basic knowledge correlated with clinical aspect.
- **Group Discussion:** Clinical cases will be discussed in groups according to the basic science and clinical practice of the focus of the course and at least 2 sessions at the outpatient clinic are planned in the afternoon.
- **Practical:** In the afternoon practical sessions the students will be given the opportunity to practice the assessment some inflammatory mediators.
- **Seminar:** The course will include of an approximately 45 min seminar at least once a week during one semester. At the end of each seminar there will be a discussion led by one of the course organizers. To increase the learning process and to stimulate the reflection on the seminars, the students will be encouraged to study the most recent literature, still not present in the text books within the presented fields, prior to each seminar.

B- Objectives

1. The main objective of this course

The persistent or unresolved inflammation is a common denominator in the genesis and manifestation of a wide range of diseases and many cancers, particularly in an aging body. Our understanding of inflammation has increased rapidly in recent years, due in large part to the impact of molecular biology and gene identification and cloning. This course brings together ideas from a number of different biochemical disciplines which are frequently not integrated. This course gives a visual overview of the inflammation three themes: the affector molecules, the regulatory components and the processes of inflammation itself. This course is essential for the master students of clinical biochemistry to be up-to-date with the latest developments in biomarkers of inflammatory diseases as they affect the diagnosis and treatment of many chronic conditions. Immunology and pathology staff members will contribute in conducting this course with biochemistry staffs.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

1) Tutorial and seminar (weekly).
2) Real cases result from hospitals and discuss effectively the diagnosis in group discussion, in order to, develop critical thinking skills.
3) Attendance and participate in national and international conference related to course topic (One at least).
4) Research project for selected up-to-date topics that recently topic does not cover in the course.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

This course is expected to provide students with complete understanding the fundamental cellular and biochemical basis of shared and interrelated features of the inflammation in the genesis and progression of diseases are expected to better guide the professionals to strategize more cost-effective designs for diagnosis and management and/or prevention of a number of age-associated disabling illnesses or cancer.

At the end of the course the participant should be able to:

- Understand the biochemical and cellular basic of the inflammatory events and be able to analyze the connection of these events to the development of diseases.
- Acquire a basic knowledge of unspecific inflammatory process of cancer associated disorders.
- Compare and contrast the function of inflammatory biomarkers in different organs and different diseases.
- Explain how diagnosis a disease can be and treated with drugs targeting the inflammatory mediators
- Select adequate experimental methods to analyze the inflammatory biomarkers based on specific scientific questions.
- Understand the relevance of the inflammatory biomarkers in the context of their research project.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
An overview of the inflammatory response: - Definition, causes, types and classification - Acute inflammation and its cardinal signs	1	2

- The major component of inflammation - The morphological characteristic of acute inflammation - Different morphological types of acute inflammation - Effects of acute inflammation - Chronic inflammation: Definition, causes, and classification. - Cells of chronic inflammation - Differentiation between acute and chronic inflammation - Systematic effect of inflammation		
Biochemical Mediators of Inflammation - Sources of mediators • Plasma derived mediators • Cell-derived chemical mediators • Involved tissues and cells - Classification of inflammatory mediators according their function: • Vasoactive and smooth muscle – constricting properties histamine and arachidonic acid metabolites • Serum protease – anti-protease system • Coagulation factors • Vasoactive peptides and cytokines – liberated from leukocytes • Oxidative – reductive systems, free radicals - Methods of detection of the inflammatory mediators	2	2
Biochemistry of Inflammation - The kinin system and inflammation - Eicosanoids (prostaglandins and leukotrienes) - The role of toxic oxygen species in inflammation with special reference to DNA damage - Glucocorticoids and lipocortin - Platelet activating factor and cytokine feedback regulation of endothelial integrity; implications for the treatment of inflammatory disease - A role for neuropeptides in inflammation - Interleukins as an inflammatory mediators - Tumour necrosis factor (TNF) and inflammation - The role of leukocyte chemotaxis in inflammation	3	4
Cytokines in inflammatory Disease - Cytokines and chemokines: sources, biological activity, diagnostic roles. - Biochemistry and Physiology of cytokines - General characteristics of cytokines - The role of cytokines in inflammation and repair - Systemic (acute-phase response) and local effects of cytokines in inflammation - Cytokines as autocrine growth factors. - Cytokine production by targeting in tumors. - Cytokine assays - Clinical applications of cytokine measurements (Graft Rejection, inflammatory arthritis sepsis, meningitis,) - Internationally available standards for cytokine - Clinical relevance and future applications of cytokine	2	2

Role of cellular proteinases in Inflammation - The classic signs of inflammation and proteolytic enzymes. - Clot lysing system and proteases including plasmin and plasminogen activators - Proteinase and protease - Role of macrophage proteinase and cytotoxic protease - Membrane-bound proteases and cytoplasmic enzymes e.g. calpains - Macrophage elastase and protease of mast cells - Role of chymase, trypase, and serine proteinase in cell lysis - Metalloproteinase and collagenase - The diagnostic role of proteinases in inflammatory diseases	1	2
The use of inflammatory laboratory tests in inflammatory diseases - Neuroendocrine Changes - Hematopoietic Changes - Metabolic Changes - Hepatic Changes - Changes in Other Components of the Plasma - ACUTE-PHASE RESPONSE: **Positive inflammatory biomarkers.** - Coagulation and fibrinolytic system - Complement system - Transport proteins - Participants of inflammatory responses - Antiproteases **Negative inflammatory biomarkers**	2	4
- Classification of biomarkers - Host defense proteins - Serum protease inhibitors - Transport protein with antioxidant activity - Examples of common clinical applications		
Inflammatory Biomarkers: Indicators of Rheumatic heart diseases -Acute phase reaction -A series of changes can be measured in the laboratory -Acute phase proteins -Positive Acute-Phase Reactants - Negative Acute-Phase Reactants - Laboratory diagnosis of Rheumatic heart diseases (RHD) - Biochemical markers and follow up of RHD	1	2
Inflammatory Biomarkers in Rheumatoid Arthritis - Serum rheumatoid factor (RF) for diagnosis the RA - Serological tests for early diagnosis of RA - Prognostic biomarkers Biomarkers for the monitorization of the disease activity - Predictive biomarkers of the response to biologic therapy	1	2
Inflammatory Biomarkers: Impact for diabetes, diabetic kidney disease (DKD), and obesity	1	2

- The interaction between insulin signalling and fatty acids in the synthesis of pro-inflammatory cytokines and inflammatory marker - Inflammatory network: Biomarkers of T2DM - Acute-Phase Proteins and Pro-Inflammatory Cytokines in the development of DM and DKD. - The Complement Cascade and Leukocytes in DM and DKD - Emergence of Neutrophil–Lymphocyte Ratio as a Potential Marker of Diabetic Kidney Disease - Use of Neutrophil–Lymphocyte Ratio in Diabetes Mellitus and in Diabetic Kidney Disease - Molecular mechanism(s) of association between Obesity, T2DM, and inflammation. - Attenuating inflammatory response in T2DM by micronutrients.		
Markers of Inflammation in Cardiovascular Diseases - Cell signaling in cardiovascular diseases - Inflammation as a key pathogenetic mechanism in Atherosclerosis - Contribution of the low-density lipoprotein in atherosclerotic lesion development - Laboratory Tests Available to Assess inflammation of CV - Sources of Variability of these Inflammatory Markers - Inflammatory Markers of CVD in Clinical Practice - Inflammatory Markers in basic science research - Diagnostic role and targeting of inflammatory biomarkers in CVD	1	2
Intestinal Inflammation and Inflammatory Bowel Disease - Inflammatory mediators in chronic GIT inflammatory diseases: pathogenesis, diagnosis, targeting, and prognosis. - Nonspecific Inflammatory bowel diseases - The most important currently used markers for nonspecific inflammatory bowel diseases - Problems in diagnosis of IBD - Platelet abnormalities during IBD - The novel markers for nonspecific inflammatory bowel diseases (IBD) - Probiotics as a promising targeting for GIT inflammatory disorders	1	2
Inflammatory biomarker in Aging and Cancer - Inflammation and age-associated diseases - Inflamm-aging and genetic damage - Association between inflammation and cancer - Fatty acid dependent modulation of the immune system Interaction of fatty acids with nuclear receptors and G protein-coupled receptors. - Inflammatory markers e.g. cytokines/chemokines, immune-related effectors, acute phase protein, ROS and RNS	1	2

- Prostaglandins, cyclooxygenases, lipoxygenases, and related factors - Transcription factors and growth factors as mediators of an inflammation and cancer association - Evaluation of current 'targeted' therapies or 'personalized' medicine - Repairing mechanisms		

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	20	4	2		2	28
	Actual						
Credit	Planned						2
	Actual						

3. Individual study/learning hours expected for students per week (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course students will be able to:		
	1.1. Advanced knowledge of a wide range of theoretical and mechanistic material that provides the basis of applied and research on inflammation and chronic disease. 1.2. Descript the main concept of inflammatory biomarkers and its relation to development of chronic diseases. 1.3. Accept knowledge about the up-to-date evidence in the field of inflammation and chronic diseases including cancer.	- Interactive Lectures: Deliver the concepts according to ILOs of each session by interactive methods of teaching. - Provide several methods of stimuli to improve the learning skills of students. - Answer any student's questions and discuss any unclear concepts either in class or during staff's office hours. - Group discussion of case scenarios related to the highlighted topics in lecture to potentiate the spring of team work.	Compose thoughtful and fair assessment tasks that assess student learning and applications of the course contents including: - Essay - Periodical tests - Oral presentation - Group project - Final examination

		- Improve the student recital in the course through staff's advices and supports. - Revising and fulfilling all required modifications that expected to improve the course according to student and staff feedback and evaluations	
2.0	**Cognitive Skills:** The course has an aim to improve the ability in the following cognitive Skills		
	1.1. Acquire scales how to interpret the lab results of patients with inflammatory diseases. 1.2. Gain knowledge of a range of practical and presentation techniques and methodologies in laboratory. 1.3. Understand the relation between inflammation development and chronic diseases based on multi disciplines include clinical biochemistry, immunology, and pathology.	- Case study. - Interactive lectures - Tutorials - Assignments	- Quiz - Written exam - Group project - Seminar
3.0	**Interpersonal Skills & Responsibility**		
	The course aims to improve the ability in the following interpersonal skills and responsibilities: 3.1. Self-dependent in information collection from primary and secondary sources. 3.2. Write and clearly report the collected information 3.3. Acquire the effective behavior in work as an individual or member of a team. 3.4. Confidence communication and interactive discussion skills. 3.5. Undergo the learning process according the	- Interactive lectures - Case discussion - Assignment using all available sources i.e. textbooks, search engine, and online data base.	- Cases reports - Seminar evaluations - Feedbacks of lecturer regard the student's active interaction.

	assigned plain and respect the ethical roles.		
4.0	**Communication, Information Technology, Numerical**		
	The course aims to improve the ability in the following Information Technology and Numerical Skills: 4.1. Practices independent lifelong learning to stay up to date in all aspect of inflammation and chronic disease 4.2. Helps others in learning and improves knowledge for patients, community, and healthcare workers. 4.3. Communicates effectively with each other and with laboratory technologists, supervisor, consultants (during hospital sessions), and other members of this course. 4.4. Participates regularly in seminar and group discussion of the course activity. 4.5. Write an essay with clear comments and further recommendations if needed. 4.6. Communicates with staff member for fulfillment the requirements to success in the course. 4.7. Improve the student's capability to used search engines and database to retrieve the recent research articles and information. 4.8. Provide the students with a variety of bioscience animation, videos, and on-line quiz that could support their visual memory and IT skills.	- Online data base and search interface. - Group discussion - Seminar - Group Project.	- Written exam. - Assignments.
5.0	**Psychomotor (if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester

Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		Week Due	Proportion of Total Assessment
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
The student has the right to contact the lecturer or coordinators by their e-mails or during their office hours for academic advices or consultations.

E Learning Resources

1. List Required Textbooks
   - Sashwati Roy, Debasis Bagchi, Siba P. Raychaudhuri: Chronic Inflammation: Molecular Pathophysiology, Nutritional and Therapeutic Interventions 1st Edition ISBN-13: 978-1439872116
   - Charles N. Serhan, Peter A. Ward, Derek W. Gilroy: Fundamentals of Inflammation. 2010. Cambridge University Press: New York. ISBN: (Hardcover) 978-0521887298.
   - Whicher, J., Evans, S.W. Biochemistry of Inflammation. 1992, Springer, ISBN 978-94-011-2996-1
   - Robert F. Diegelmann, Charles E. Chalfant Basic Biology and Clinical Aspects of Inflammation *Frontiers in Inflammation* Bentham, 2016

2. List Essential References Materials (Journals, Reports, etc.)
   - https://journal-inflammation.biomedcentral.com/
   - https://journals.sagepub.com/home/eji

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.
   - http://www.inflammationsocieties.org/
   - http://www.inflammationresearch.org/

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
   - Auditoriums
   - Laboratory

2. Technology resources (AV, data show, Smart Board, software, etc.)
   - Audio-visual equipment for teaching (projector, microphones, speakers, board)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - Evaluation questionnaires of the staff at the end of the course
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development - Reviewing and implementing appropriate changes in the course based on the student feedback and evaluations
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. - Regular meeting to the staff to review the course effectiveness

Name of Course Instructor: Mahmoud Zaki El-Readi

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Bioinformatics in Medicine

Date: 2018-11-06.	**Institution:** Umm Al-Qura University
College: Medical college	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: Bioinformatics In Medicine
2. Credit hours: 2
3. Program(s) in which the course is offered. MSc Clinical Biochemistry
4. Name of faculty member responsible for the course:
Dr. Mahmoud Zaki El-Readi
Dr. Mohammad Althubiti
5. Level/year at which this course is offered: Post graduate
6. Pre-requisites for this course (if any): --
7. Co-requisites for this course (if any): --
8. Location if not on main campus: --
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	
b. Blended (traditional and online)		percentage?	50%
c. E-learning		percentage?	30%
d. Correspondence		percer	
f. Other	√	percentage?	20%

Comments:20% computer lab and software tutorial

B- Objectives

1. The main objective of this course

Bioinformatics is an important and highly interesting discipline of molecular biology and biomedical research, which taking advantage of information technology, in order to, organize and manage databases on the molecular level. The goal of the course is to give students "hands-on" experience with Biomedical data sets related to disease. The students will learn basic concepts in statistics and the programming language R, in order to analyze different forms of high-throughput genomic data. This course will focus on the importance of the bioinformatics as applied computer science and information technology to research and interpret biological data on a large scale. Different software including bioinformatics software and molecular biology methods will be explored through a series of lectures. Moreover practical application and evaluation of bioinformatics software as well as hands-on tutorials that will cover concepts of the bioinformatics will be applied. In addition the tutorials will show the application of different bioinformatics researches in human diseases, data analysis to find causative variants in cancer and hereditary disease and finally to found accurate discovery and conduct verification and validation.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The tutorials will be introduced as a small group discussion to develop critical thinking skills in either in the critical analysis and interpretation of results.

In order to improve the course quality, we will hold lectures and offer the student script and research papers and reviews articles. At the end of the course we will give the student a form for suggestions and further interest.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

To uncover the variants in medical or cancer diseases, which lead to breakthrough discoveries in human diseases. Bioinformatics software will be provided to conduct a comprehensive and accurate data analysis platform that enables you to find important results in a large scale of data. With its end-to-end analysis workflows, visualization modules, and tools, the bioinformatics enables easy, fast and accurate discovery, verification, and validation of novel variants causing cancer or inherited diseases. The course treats both sequences related and non-sequence related bioinformatics including databases, handling of sequence data, pair-wise alignment, and multiple alignment. Furthermore, the course treats: bioinformatics portals and different search engines, patterns and motives for DNA and proteins, profile searches and structure predictions, molecular modeling with ligand dockings, enzyme databases as well as microarray and gene ontology data, A short background is given to the algorithms that are used in the different programs. In addition, the course demonstrates the using of bioinformatics tools in cancer genes network analysis specifically, correlation between wild and/ or mutated gene expression and prognosis, histological grading and staging of different cancers.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Bioinformatics Overview: - Introduction about the bioinformatics and how use it - Cutting and cloning including Restriction enzyme and site analyses, Molecular cloning and Gel electrophoresis	1	2

Sanger Sequencing Data Analysis: - Importing and viewing trace data, - Trim and assemble sequences to reference, - View edit and Reassemble contig with read mappings				1		2
Whole genome sequencing (WGS): - General Workflows (WGS) - Somatic Cancer and Hereditary Disease				1		2
Whole exome sequencing (WES): - General Workflows (WGS) - Somatic Cancer and Hereditary Disease				1		2
Whole Transcriptome Sequencing (WTS) - Analysis samples, Annotate Variants and Compare variants in DNA and RNA - Identify Candidate Variants and Genes and add expression values - Identify Differentially Expressed Genes and Pathways				1		2
Identify candidate variants tools: - Identify candidate variants - Identify variants with effect on splicing				1		2
Identify candidate gene tools: - Found differentially expressed genes and pathways - Identify mutated genes				1		2
Viewing protein structures in 3D: - Importing molecule structure files and viewing molecular structures in 3D - Linking sequence and Protein structure				1		2
Molecular dynamic (MD) simulation using CHARMM-GUI program - Evaluation of non-synonymous variants to determine pathogenicity				1		4
Ingenuity pathway analysis - Identifying key regulators and activity to explain expression patterns - Predicting downstream effects on biological and disease processes - Providing targeted data on genes, proteins, chemicals, and drugs - Building interactive models of experimental systems				1		4
Analysis gene network in cancer using cBioPortal, ppisurv, proggene v2 and others. - Study the correlation between specific gene mutation and different cancer staging. - Study the potential prognostic values of mutated genes and survival rate in different cancer types. - Study the potential prognostic value of expression patterns of genes and survival rates in different cancers. - Study the genetic mutation frequency in different stages, ethnicities and histological grades in different types of cancer.				1		4
2. Course components (total contact and credit hours per semester):						
	Lecture	**Tutorial**	**Laboratory/**	**Practical**	**Other**	**Total**

				Studio			
Contact Hours	Planned	18	2	8			28
	Actual						
Credit	Planned						2
	Actual						

3. Individual study/learning hours expected for students per week (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.

Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course students will be able to:		
1.1	- Explain and describe theories and methods that are used within bioinformatics.	The teaching includes: - Interactive lectures - Demonstrations - Group- and data practical with written assignments. - The data analyses will be carried out using web-based programs.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory. - Practical exam for data analysis
2.0	**Cognitive Skills:** The course has an aim to improve the ability in the following cognitive Skills		
2.1	- Account for how bioinformatics methods are used within biomedical research	The teaching includes: - Interactive lectures - Demonstrations - Group- and data practical with written assignments. - The data analyses will be carried out using web-based programs.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory. - Practical exam for data analysis.
3.0	**Interpersonal Skills & Responsibility**		

	- Use different bioinformatics technologies - Analyze bioinformatics data - Critically assess and evaluate which methods that should be used to solve specific bioinformatics issues.	The teaching includes: - Interactive lectures - Demonstrations - Group- and data practical with written assignments. - The data analyses will be carried out using web-based programs.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory. - Practical exam for data analysis
4.0	**Communication, Information Technology, Numerical**		
	The course aims to improve the ability in the following Information Technology and Numerical Skills: - Participates regularly in seminar and group discussion of the course activity. - Write an essay with clear comments and further recommendations if needed. - Communicates with staff member for fulfillment the requirements to success in the course. - Improve the student's capability to used search engines and database to retrieve the recent research articles and information. - Provide the students with a variety of bioscience animation, videos, and on- line quiz that could support their visual memory and IT skills.	The teaching includes: - Interactive lectures - Demonstrations - Group- and data practical with written assignments. - The data analyses will be carried out using web-based programs.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory. - Practical exam for data analysis
5.0	**Psychomotor(if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

The student has the right to contact the lecturer or coordinators by their e-mails or during their office hours for academic advices or consultations.

E Learning Resources

1. List Required Textbooks

- Biomedical genomics workbench
- Bioinformatic for Dummies
- Zvelebil, Marketa J.; Baum, Jeremy O. Understanding bioinformatics New York : Garland Science, c2008. - xxiii, 772 p. ISBN:978-0-8153-4024-9 (pbk.) LIBRIS-ID:10724573

2. List Essential References Materials (Journals, Reports, etc.)

Bioinformatics
Bioinformatics and Biology Insights
BMC Bioinformatics
Current Bioinformatics
Database
Evolutionary Bioinformatics
EMBnet.journal

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.

http://genetics.bwh.harvard.edu/pph2
www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Nucleotide
www.ncbi.nlm.nih.gov/entrez/query.fcgi?DB=pubmed
www.expasy.ch
www.ebi.ac.uk
www.ncbi.nlm.nih.gov
www.rcsb.org/pdb/
www.genome.ad.jp
genes.mit.edu
bioinf.cs.ucl.ac.uk/psipred/
https://www.qiagenbioinformatics.com/products/ingenuity-pathway-analysis/
http://www.cbioportal.org/
http://www.bioprofiling.de/GEO/PPISURV/ppisurvD.html
http://watson.compbio.iupui.edu/chirayu/proggene/database/index.php

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Computer and Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)
1. accommodation (classrooms, laboratories, demonstration rooms/labs, etc.) - Classrooms - Computer lab
2. Technology resources (AV, data show, Smart Board, software, etc.) - Audio-visual equipment for teaching (projector, microphones, speakers, board)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) - Biomedical genomics software

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - Evaluation questionnaires of the staff at the end of the course
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development - Reviewing and implementing appropriate changes in the course based on the student feedback and evaluations
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. - Regular meeting to the staff to review the course effectiveness

Name of Course Instructor: Dr. Mahmoud Zaki El-Readi & Dr. Mohammad Althubiti

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi _____

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Bio-Neurochemistry in Medical Laboratory

Date: 2018-11-06.	**Institution:** Umm Al-Qura University
College: Medical college	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: Bio-Neurochemistry in Medical Laboratory
2. Credit hours: 2
3. Program(s) in which the course is offered. MSc Clinical Biochemistry
4. Name of faculty member responsible for the course:
Prof. Wesam Ahmed Nasif
Dr. Mahmoud Zaki El-Readi
5. Level/year at which this course is offered: Post graduate
6. Pre-requisites for this course (if any): --
7. Co-requisites for this course (if any): --
8. Location if not on main campus: --
9. Mode of Instruction (mark all that apply):

a. Traditional classroom	√	percentage?	80%
b. Blended (traditional and online)		percentage?	
c. E-learning		percentage?	
d. Correspondence		percer	
f. Other	√	percentage?	20%

Comments:

B- Objectives

1. The main objective of this course

The purpose of this course is to support you knowledge about neurotransmitters and to help you understand their significance in health and illness. This course focuses on the neurochemical analysis of body fluids include cerebrospinal Fluid (CSF), urine, and blood. The course covers a wide range of neurochemical analyses for application in patient diagnostics and research projects.

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

The tutorials will be introduced as a small group discussion to develop critical thinking skills in either in the critical analysis and interpretation of results.

In order to improve the course quality, we will hold lectures and offer the student script and research papers and reviews articles. At the end of the course we will give the student a form for suggestions and further interest.

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

The course aims to provide students with a sound multidisciplinary background in neurochemistry laboratory and provides a good platform for further graduate studies or for a professional career, both in KSA and internationally. A detailed analysis of the molecular mechanisms underlying the action of neurotransmitters and neuropeptides in the nervous system. The biochemical pathways for the synthesis and catabolism of neurotransmitters and neuropeptides, the role of neurotransmitters vs. neuromodulators will be illustrated by using selected examples. Basic concepts in the interaction of neurotransmitters and peptides with their receptors will be discussed. The role of neurotransmitter - peptides interactions and their relevance in selected diseases will also be addressed. This course focuses on the neurochemical analysis of body fluids include cerebrospinal Fluid (CSF), urine, and blood. The course covers a wide range of neurochemical analyses for application in patient diagnostics and research projects. The course is closely connected with medical laboratories and research and designed to cover most specializations within neurochemistry, including the molecular mechanisms behind neuro-metabolic disorders, and neurodegenerative conditions like Alzheimer's disease.

Upon completion of this course, the student:

- Acquire knowledge of the basic neurochemistry of the brain
- Describe the different classes of neurotransmitters and their functions
- Outline receptor regulation: receptor up and down regulation
- Understand the structure of receptors and what their role is in neurotransmission;
- Identify the neurotransmitter systems and their functions
- Understand the neurochemical processes that underlie brain states and diseases
- Integrate mechanisms and neurochemical substances with neurometabolic disorders, neurodegenerative diseases, and inflammatory disorders.
- Apply this knowledge to critical reading of primary literature and to form, express and explain opinions on selected topics on neurochemistry laboratory.
- Learn to critically assess learned topics and present a chosen topic in an clear way to a diverse audience of co-students.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
1. Neurotransmitter: Overview and Functions	1	2

- Introduction to Neurotransmitters - Neurotransmitter Functions - Overview of Human Nervous System - Neuromuscular Transmission - Neurotransmitter Receptors - Neurotransmitters		
2. Neurotransmitter Laboratory Tests - List of NT that tested - Neurotransmitter tests as an adjunct diagnostic tool - Sampling of NT Tests and their correlation with NT levels in the Brain - Neurotransmitter overall levels and time of measure - Lab tests and neurotransmitter receptors - Neurotransmitter testing and scientific validity	1	2
3. CSF Neurotransmitters - Cerebrospinal fluid neurochemistry collection protocol - Cerebrospinal fluid neurochemistry - medication effects - Information for referring laboratories - Biochemical analysis of CSF	1	2
4. Disorders of Neurotransmitter Biosynthesis - Diagnosis of neurotransmitter biosynthesis disorders - Neurotransmitter metabolites in CSF - Neurotransmitter metabolites in urine - Enzyme activities can be measured in serum/plasma - Genetic analysis	1	3

5. Neuro-metabolic disorders
- *Clinical and biochemical features of:*
  - Lacticacidosis
  - Glucose transporter defect (CSF/plasma glucose ratio).
  - Non-ketotic hyperglycinaemia
  - Serine deficiency disorders: (CSF and plasma amino acid analysis).
  - Folinic acid responsive seizures
  - GABA metabolism disorders
	1	2

6. Clinical and biochemical features of monoamines disorders:
- *Clinical and biochemical features of*:
  - Affecting dopamine and serotonin metabolism
  - Monoamine oxidase deficiency: Depression, ADHD, and aggression
  - Catechol-O-methyltransferase deficiency
  - Dopamine β-hydroxylase deficiency: orthostatic hypotension in adolescents and adults
  - Tryptophan hydroxylase deficiency
  - Dopamine and serotonin transporters defect
	1	3

7. Testing for Neurotransmitter Imbalances in brain: - Neurotransmitter tests. - Kryptopyrrole or HPF urine test - Zinc taste test (ZTT) - Homocysteine test - Fatty Acid Analysis. - Adrenal Stress hormone test: - Testing for hormone imbalance - IgG intolerance test - Standard biochemical indicators.	1	3
8. **Biochemistry of neurodegenerative diseases** - Common basic and clinical markers of neurodegenerative disease - Biochemical aspects of neurodegenerative diseases	1	2
9. Neuro-markers of Parkinson's disease and other movement disorders: - Multiple System Atrophy - Progressive Supranuclear Palsy - Corticobasal Syndrome	1	2
10. Neuro-markers of Alzheimer and non-Alzheimer's Dementias - Diagnostic markers of Alzheimer - Diagnostic markers Non-Alzheimer's Dementias • Vascular Dementia • Frontotemporal Dementia • Dementia with Lewy Bodies	1	3
11. Neuro-markers of Infectious Disorders - Neuroborreliosis - Neuro-tuberculosis - Neuro-lues (neuro-syphilis) - Neuro-HIV	1	2
12. Neuro-markers of Inflammatory Disorders - Paraneoplastic syndromes / limbic encephalitis - Multiple Sclerosis - Devic's Neuro Myelitis Optica - Vasculitis and primary angiitis - Neuro-sarcoidosis	1	2

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	20	4	4			28
	Actual						
Credit	Planned						
	Actual						

3. Individual study/learning hours expected for students per week (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.
Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course students will be able to:		
1.1	- Explain and describe theories and basic information about neurochemistry and its application in medical laboratory.	The teaching includes: - Interactive lectures - Demonstrations - Assignments.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory.
2.0	**Cognitive Skills:** The course has an aim to improve the ability in the following cognitive Skills		
2.1	- Account for how the neurotransmitters used as a diagnostic tool for patients and research projects.	The teaching includes: - Interactive lectures - Demonstrations - Assignments.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory.
3.0	**Interpersonal Skills & Responsibility**		
3.1	- Use different methods of assay for body fluid. • - Analyze the report and results body fluids results. - Critically assess and evaluate which methods that should be used to diagnosis specific neurological or metabolic disorders.	The teaching includes: - Interactive lectures - Demonstrations - Assignments.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and exercises are compulsory.
4.0	**Communication, Information Technology, Numerical**		
	The course aims to improve the ability in the following Information Technology and Numerical Skills: - Participates regularly in seminar and group discussion of the course activity. - Write an essay with clear comments and further recommendations if needed. - Communicates with staff member for fulfillment the requirements to success in the course.	The teaching includes: - Interactive lectures - Demonstrations - Assignments.	- The course is examined through a written examination. - Compulsory participation - All tasks and written assignments must be passed. - Attendance on lectures and

	- Improve the student's capability to used search engines and database to retrieve the recent research articles and information. - Provide the students with a variety of bioscience animation, videos, and on-line quiz that could support their visual memory and IT skills.		exercises are compulsory.
5.0	**Psychomotor(if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

The student has the right to contact the lecturer or coordinators by their e-mails or during their office hours for academic advices or consultations.

E Learning Resources

1. List Required Textbooks

- Dawson, TM; Dawson, VL.*Molecular pathways of neurodegeneration in Parkinson's Disease*. Science, 2003. p.819-822
- Carlson, Neil R. Physiology of Behavior. Boston: Pearson Education, Inc., 2007.
- Purves, Dale, et al. Neuroscience, 4th Edition. Sunderland, MA: Sinauer Associates, Inc., 2008.
- Durand, V. Mark, and David H. Barlow. Essentials Of Abnormal Psychology. 5th. 12. Belmont: Wadsworth Pub Co, 2009. Print.
- Levinthal, Charles, "Drugs, Behavior, and Modern Society", Pearson Education, Inc., 2008
- Mark's Basic Medical Biochemistry, 4th ed, pp. 908-918

2. List Essential References Materials (Journals, Reports, etc.)

1. Boeree, George. "Neurotransmitters." General Psychology. N.p.. Web. 10 Nov 2012. <http://webspace.ship.edu/cgboer/genpsyneurotransmitters.html>.
2. "Prostaglandins." Virtue Chembook. Chemistry Department, Elmhurst College. Web. 10 Nov 2012. <http://www.elmhurst.edu/~chm/vchembook/555prostagland.html>.
3. Purves, Dale, "Principles of Cognitive Neuroscience", Sinauer Associates, Inc., 2008 Levinthal, Charles, "Drugs, Behavior, and Modern Society", Pearson Education, Inc., 2008

3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. 1. https://www.macalester.edu/projects/UBNRP/meth08/biochemistry/neurotransmitter.htm 2. http://www.cerebromente.org.br/n12/fundamentos/neurotransmissores/nerves.html 3. https://en.wikibooks.org/wiki/Structural_Biochemistry/Neurotransmitters#References 4. https://themedicalbiochemistrypage.org/nerves.php
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Computer and Software

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access,etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) - Classrooms - Laboratory
2. Technology resources (AV, data show, Smart Board, software, etc.) - Audio-visual equipment for teaching (projector, microphones, speakers, board)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching - Evaluation questionnaires of the staff at the end of the course
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
3. Procedures for Teaching Development - Reviewing and implementing appropriate changes in the course based on the student feedback and evaluations
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. - Regular meeting to the staff to review the course effectiveness

Name of Course Instructor: Prof. Wesam Ahmed Nasif& Dr. Mahmoud Zaki El-Readi

Signature: _____ **Date Completed:** _____

Program Coordinator: Dr. Hiba Saeed A. Bagader Al-Amodi

Signature: _____ **Date Received:** _____

Elective Courses

COURSE SPECIFICATIONS
Form

Course Title: Point of Care Testing (POCT)

Date: 20....-.....-.....	**Institution:** Umm Al Qura University
College: Faculty Of Medicine	**Department:** Biochemistry

A. Course Identification and General Information

1. Course title and code: Elective course; 1001601-8			
2. Credit hours: 2H			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: Dr. Abeer Ahmed/ Dr. Hala Kamel			
5. Level/year at which this course is offered: Medical/ Laboratory Science Graduated Students			
6. Pre-requisites for this course (if any):			
7. Co-requisites for this course (if any):			
8. Location if not on main campus:			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	✓	percentage?	60 %
b. Blended (traditional and online)	✓	percentage?	20%
c. E-learning		percentage?	
d. Correspondence		percentage?	
f. Other	✓	percentage?	20%

Comments:

B- Objectives

Point of care testing (POCT) is a rapidly growing components of health care services, is laboratory testing conducted close to the site of patient care

Main objectives of this course

- This course will provide the foundation knowledge and practical skills to undertake diagnostic tests using point of care devices to assist in patient management.
- Able to apply a range of diagnostic methodologies relevant to Point of Care Testing
- Contributing to professional work settings through responsible, self-managed, and independent work

Specific objectives

- To know the purpose and the setup system of POCT
- Interact with simulated role-play patients with regard to their personal safety, comfort and wellbeing and consideration of cultural, ethnic and personal privacy issues.
- To be familiar with the most important tests done by POCT
- Critically evaluate and select analytical devices for use in s point of care setting
- Accurately perform test procedures using a variety of analytical devices.
- To have knowledge about the system of POCT including IT and troubleshooting
- Extensively validate POCT methods to determine their fitness for purpose and acceptability with consideration of the total testing process and quality framework.
- Interpret the clinical significance of test results and explains the discrepancy between main laboratory and POCT results.
- Prepares reports conveying appropriate information to clinicians and when to communicate with related patient's physician
- Be aware about Patient benefit to cost ratio

2. Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- A variety of activities during the course will involve online materials
- The theory component of this course is on-line with self-directed study.
- And continuous updating of the course

C. Course Description (Note: General description in the form used in the program's bulletin or handbook)

Course Description:

POC testing is considered as an integrated part of clinical laboratory service and is under the direction of the central laboratory.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours

Principle of POCT and measurands
• Current definition of POCT
• Area of use of POCT
  ○ Inpatient care
  ○ Outpatient care
  ○ Special area
  ○ Patient self-monitoring
  ○ Relative medical indication
• Potential Advantages and Disadvantages of Point-of-Care Testing
• Criteria for selecting tests suited for POCT
	1	2

Analytical and technological aspects of POCT • Required Features of Point-of-Care Testing Devices • Key design components of POCT devices: Operator interface: Bar code identification system; Sample delivery devices; Reagent storage and availability; Reaction cell; Sensors; Control and communication systems; Data management and storage • Newer and Emerging Point-of-Care Testing Technologies • Informatics and Point-of-Care Testing	2	4
The Laboratory's Role in Point of Care Testing (POCT) • Laboratory Staff Involvement with Point-of-Care Testing (POCT) • risk Management • Training of POCT operator • Competency Assessment and Certification	1	2
Implementation and Management Consideration • Establishment of Need • Standard operating procedures • Organization and Implementation of a Point-of-Care Testing Coordinating Committee • Point-of-Care Testing Policy and Accountability • Equipment Procurement and Evaluation • Maintenance and Inventory Control • Documentation • Information technology (IT) systems for POCT • Accreditation and Regulation of Point-of-Care Testing	1	2

Current Clinical Applications of POCT This topic will deliver advanced specialist knowledge (aimed at the level of a Point-of-Care Co-ordinator) on the use of POCT in different disease states and clinical settings including: • Blood gases, acid-base equilibrium and electrolytes • Glucose • Clinical chemistry • CRP • Lipid metabolism • Bilirubin • Hematology • Coagulation system • Cardiovascular diagnostic testing • POCT for infectious and emerging diseases • POCT for drugs of abuse testing in the workplace.	3	6

POCT in the emergency department
• Challenges of adopting POCT in the ED
• POCT IN ED
  ○ STAT
  ○ Cardiac biomarkers (Troponin/ BNP)
  ○ Lactate
  ○ Pregnancy test
  ○ ABG
  ○ Ketones
  ○ HIV
• Impact of POCT on operational decision making, and outcomes, in the ED
	1	2

Proficiency Testing and Quality Assurance for POCT • Pre- and post-analytical quality assurance • Calibration and quality control requirements, including acceptable limits, appropriate record keeping and required actions for failed results • Control samples, accurate and reliable results • Internal and external quality control • Guidelines for Safe and Effective Management and Use of Point of Care Testing • Training Checklist for testing personnel.	2	4
Validation, Safety and Implementation • Method validation; Reportable range/linearity • CLIA License and Regulation • Key Elements of the Business Case for Point-of-Care Testing to Inform the Adoption and Implementation (Plan) • Patient and provider safety • Clinical Effectiveness • Cost Effectiveness	1	2

Guidelines and Safety consideration • International Standards and Guidelines Related to Point-of-Care Testing • Appropriate health and safety and/or infection control legislation • Maintenance and service of POC Instruments • Ethical conduct.	1	2
Future perspective, challenges and analytical and health care trend for POCT • Analytical trend • Trend in Healthcare • POCT results documentation, electronic charts and recording. • Communication between the POCT device and data management software • Integrated Lab-on-a-Chip Devices for Point-of-Care Diagnostics • Multiplexed Point-of-Care Testing – xPOCT • compliance documentation and operational management challenges	1	2

2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	CBL	Hospital placement	Total
Contact Hours	Planned	12	8		6	4	30
	Actual						
Credit	Planned	1	0.5		0.5	0.5	2
	Actual						

3. Individual study/learning hours expected for students per week. (2)

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column.
Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	To discuss principles and the setup system of POCT	Lectures Tutorial Self learning Group discussion	Written exam (MCQ)
1.2	To have knowledge about the system of POCT including IT and troubleshooting		
2.0	**Cognitive Skills**		
2.1	Critically evaluate and select analytical devices for use in s point of care setting	TBL	Written exam (MCQ)

2.2	Discuss aspects of Validation of POCT methods to determine their fitness for purpose and acceptability with consideration of the total testing process and quality framework	Interact with simulated role-play patients Case presentation	Case
2.3	Interpret test results and explains the discrepancy between main laboratory and POCT results		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Contributing to professional work settings through responsible, self-managed, and independent work	TBL Hospital placement	Case presentation Assignment report from hospital
4.0	**Communication, Information Technology, Numerical**		
4.1	Prepare reports conveying appropriate information to clinicians and when to communicate with related patient's physician	Tutorial Group discussion	Group discussion
4.2	Discuss computational system of POCT including IT and troubleshooting		
5.0	**Psychomotor(if any)**		
5.1			

5. Assessment Task Schedule for Students During the Semester			
Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation		**Week Due**	**Proportion of Total Assessment**
1	Completion of case-based assignments	Continuous assessment	10 %
2	Problem based Learning evaluation (small group discussion)	Continuous assessment	10%
3	Mid –term MCQ	7th week	20 %
4	Presentation of group assignment (PBL)	8th Week	10 %
5	Seminar	12th week	10 %
6	Final multi-disciplines Comprehensive Exam (MCQ and written; integrated)	Week 16	40%

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

E Learning Resources

1. List Required Textbooks
   - Tietz Textbook of Clinical Chemistry; WB Saunders Burtis, C.A. & Ashwood, E.R
   - Tietz Fundamentals of Clinical Chemistry; WB Saunders Burtis C.A., E.R. Ashwood, D.E. Bruns and N.W. Tietz
   - Clinical Chemistry; Elsevier Science Health Science Div. Marshall, W.J.
2. List Essential References Materials (Journals, Reports, etc.)

• Point-of-Care Testing in Hospitals and Primary Care. Ralf Junker, Prof. Dr. med.,*,1 Harald Schlebusch, Prof. Dr. med.,2 and Peter B. Luppa, Prof. Dr. med • Clinically relevant analytical techniques, organizational concepts for application and future perspectives of point-of-care testing Peter B. Luppa , Andreas Bietenbeck a , Christopher Beaudoin a , Ambra Giannetti
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. • http://www.kbv.de/ebm2009/EBMGesamt.html. • https://www.labce.com/point_of_care_testing.aspx
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching • Student survey for evaluation of the course (by software program)
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department • Postgraduate student's discussion • Feedback
3. Procedures for Teaching Development • Improvement of the course regarding students' feedback • Updating the course regarding recent researches
4. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) • Analysis of results according to standard methods of evaluation • Statistical analysis of students' marks in progress and final tests
5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. The course effectiveness is reviewed annually by the postgraduate committee of biochemistry department

Name of Course Instructor: Dr. Abeer Ahmed/ Dr. Hala Kamel

Signature: _____ **Date Completed:** _____

Program Coordinator: _ Dr. Hiba Saeed A. Bagader Al-Amodi _

Signature: _____ **Date Received:** _____