هيئة تقويم التعليم
Education Evaluation Commission
المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

Blood Biochemistry (BCH 471)

King Saud University
College of Science
Biochemistry Department

هيئة تقويم التعليم
Education Evaluation Commission

Course Specifications

Institution: **King Saud university**	Date of Report: **25/02/2018**
College/Department **Science/Biochemistry**	

A. Course Identification and General Information

1. Course title and code: **Blood Biochemistry (BCH 471)**
2. Credit hours**: 3(2+0+2)**
3. Program(s) in which the course is offered.
(If general elective available in many programs indicate this rather than list programs)
Undergraduate students in biochemistry
4. Name of faculty member responsible for the course:

Male Section	**Female Section**
Dr. Mohamed Saad Daoud	**Dr. Jihan Mesfer Meshref Al-Ghamdi**

5. Level/year at which this course is offered: **Level 6/ Year 3**
6. Pre-requisites for this course (if any): **BCH 320**
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	✓	What percentage?	**70**
b. Blended (traditional and online)		What percentage?	
c. e-learning		What percentage?	
d. Correspondence		What percentage?	
f. Other	✓	What percentage?	**30**

Comments: **Other represent Practical class**

B. Objectives

1. What is the main purpose for this course? **The students get important knowledge's from this course about composition of blood, plasma proteins. Blood clotting mechanism. Erythrocytes, structure & metabolism. Blood group substances. Hemoglobin, types, structure & functional properties. Metabolism of iron & its relevance to some types of anemia.**
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • **Introduce the new information concerning the blood biochemistry through web-based reference material.** • **Update the content of course as a result of the recent research in the field.** • **Sharing of students in the education process through tutorial classes.** • **Power point presentations are used to facilitate the understanding of the course.**

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Introductions to the fluids of the body and their distribution, interstitial, intracellular and extracellular	**0.5**	**1**
Blood: Its function, physical properties and composition; blood cells, plasma, serum, blood parameters; CBC, red cell indices, hematocrit, erythrocyte sedimentation rate and its significance.	**1**	**2**
Blood plasma: its normal composition and variation in disease states. **Plasma proteins; types (albumin, α1, α2, β1, β2, γ-globulins and fibrinogen); functions, biosynthesis, abnormalities, variation in different diseases; liver diseases, kidney diseases, multiple myeloma.**	**2**	**4**

Plasma lipoproteins **Plasma enzymes**	**2**	**4**
White blood cells, types, and structure, function and abnormalities; leukemia and other neoplasia.	**1**	**2**
Platelets; Blood coagulation pathways and homeostasis; disorders of blood clotting. Vitamin K deficiency; hemophilia	**1.5**	**3**
Blood formation: erythropoiesis; requirements; erythropoietin regulation; disorders of blood formation **Erythrocytes: structure and composition; erythrocyte membrane and cytoskeleton; advantage and disadvantage of anucleated cells**	**1.5**	**3**
Red cell metabolism; glycolysis, pentose phosphate pathway; importance of glutathione; G6PDH deficiency and other enzyme deficiency and other enzyme deficiencies affecting red cell metabolism **Erythrocyte hemolysis; heme degradation and bilirubin formation: conjugation and excretion of bilirubin; Jaundice and its types**	**1.5**	**3**
Hemoglobin: structure and function allosteric protein. O_2 binding and effect of different factors on oxygen binding: cooperative effect bohr's effect; biosynthesis of hemoglobin and its requirements; types of hemoglobin; variation in hemoglobin types during development (ontogeny)	**1.5**	**3**
Blood groups and blood transfusion; ABO, Rh, and duffy blood groups	**1**	**2**
Anemias: definition and types. Acquired and genetic anemias; iron deficiency anemia; aplastic anemia; sickle cell anemia; thalassemia; G-6-PD deficiency; polycythemia	**1.5**	**3**
Total	**15**	**30**

Topic	No of weeks	Contact hours
Practical part **Introduction to laboratory experiments on blood (blood extraction with and without anticoagulants, different types of anticoagulants, importance of fluoride, serum and plasma difference, handling and storage, blood detection and precautions necessary when handling blood) +Separation of Plasma and Serum from Whole Blood**	**1**	**2**
Separation of main proteins in plasma and serum	**1**	**2**
Hemolysing Agents& Detection of blood by Benzidine Test	**1**	**2**
Determination of plasma enzymes using the clinical analyzer	**1**	**2**
ABO blood group & Rh groups	**1**	**2**
Hemoglobin, Anemia,HcT and ESR	**1**	**2**
Estimation of Serum Bilirubin [Total and Direct]	**1**	**2**
Glucose-6-phosphate dehydrogenase deficiency	**1**	**2**
Sickle cell test	**1**	**2**
Determination of serum iron	**1**	**2**
Red & White Blood Cell Count Differential Count& Blood cell auto counter.	**1**	**2**
Electrophoretic Separation of Serum Proteins	**2**	**4**
Prothrombin time and coagulation time	**1**	**2**
Total	**14**	**28**

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

The course is taught as lecture (two per week) and practical (once per week)
The lecture time is 50 minutes
The practical time is 2 hours
Each semester consists of 16 weeks. It is distributed as follows (15 weeks teaching X2lectures (one week) for midterm exams (1st and 2nd exams Theory) and (14 weeks' practical lessons + 2 weeks for midterm practical exams). The Final Exam Period is after the 16 weeks. The final exam is here counted as one week.

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**15 weeks x 2hours = 30 Hours**	**-**	**-**	**14 weeks x 2 hours = 28 Hours**	**-**	**58**
Credit	**2**	**-**	**-**	**1**	**-**	**3**

3. Additional private study/learning hours expected for students per week.0

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

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The ***National Qualification Framework*** provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

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 intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge** By the end of the course, students should be able to:		
1.1	Demonstrate an understanding of the properties, composition and functions of the human blood. (@ILO-5)	Lectures	Quizzes/Midterm Exam
1.2	Recognize basic scientific knowledge related to normal hematopoiesis.(@ILO-5)		
1.3	Describe plasma protein fractions and enzymes and their significance in clinical diagnosis. (@ILO-4)		
1.4	Define erythrocytes formation, function and metabolism. (@ILO-2)		
1.5	Define white blood cells formation, classification, function and metabolism.(@ILO-2)		
1.6	Describe blood clotting mechanism, natural and artificial inhibitor of clotting. Diagnosis of clotting disorders. (@ILO-5)		
1.7	Know basic scientific knowledge related to hematological disorders. (@ILO-5)		
2.0	**Cognitive Skills** By the end of the course, students should be able to		
2.1	Identify chemical properties of blood. (@ILO-6)	Lab The teaching staff gives examples and presents topics intended to be used for the development of cognitive skills.	Lab. quizzes/Midterm Exam Open discussion
2.2	Identify plasma proteins & plasma enzymes (@ILO-6)		
2.3	Identify white blood cells structure and types (@ILO-6)		
2.4	Identify erythrocytes structure&functions.		

	(@ILO-6)		
2.5	Identify blood clotting& anticoagulants. (@ILO-6)		
2.6	Examine and identify hematological disorders. (@ILO-5,@ILO-6)		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Work independently and as part of a team. (@ILO-12)	Lab	Open discussion and checking their homework assignment
3.2	Mange resources & time. (@ILO-12)		
3.3	Ability to write short report on interesting topic in blood. (@ILO-9,@ILO-12,@ILO-13)		
4.0	**Communication, Information Technology, Numerical**		
4.1	Use computers in reaching biomedical information to remain current with advances in knowledge and practice (@ILO-9)	Lab	Open discussion and checking their homework assignment
4.2	Should able to write scientific article (@ILO-9,@ILO-12,@ILO-13)		
5.0	**Psychomotor**		
	Not applicable		

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

NQF Learning Domains	Suggested Verbs
Knowledge	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
Cognitive Skills	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise

Interpersonal Skills & Responsibility	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
Communication, Information Technology, Numerical	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
Psychomotor	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct

Suggested ***verbs not to use*** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

5. Schedule of Assessment Tasks for Students During the Semester

The course marks are distributed as follows:
15 marks 1st exam theoretical
15 marks 2nd exam theoretical
5 marks theoretical assignment and quizzes
10 marks 1st exam practical
10 marks 2nd exam practical
5 marks lab assignment and quizzes
= 60 marks semester work + 40 marks on final exam = 100 marks

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	**1st assessment exam**	**5**	**15**
2	**2ndassessmentexam**	**10**	**15**
3	**Assignment and quizzes**	**Along the semester**	**5**
4	**Practical**	**Along the semester**	**25**
5	**Final exam**		**40**

D. Student Academic Counseling and Support

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

4office hours/week

E. Learning Resources

1. List Required Textbooks **Chris Pallister: Blood: Physiology and Pathophysiology. Butterworth/ Heinemann. 1994**
2. List Essential References Materials (Journals, Reports, etc.) - **Smith, E.L., R.L. Hill, I.R. Lehman, R.J. Lefkowitz, P. Handler, and A. White, 1983. Principles of Biochemistry: Mammalian Biochemistry. Seventh edition. McGraw-Hill Book Company, Lond** - **Victor A Hoffbrand, Paul Moss, J Pettit; Essential Haematology (Essentials Series Blackwell Science, New York; 2008**
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) Related texts on the internet
1. List Electronic Materials(eg. Web Sites, Social Media, Blackboard, etc.) - **Websites on the internet that is relevant to the topics of the course.**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. **None**

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.) - **A well-equipped and maintained classroom (Overhead projector, KSU-installed podium and smart Board)** - **The number of seats per room does not exceed 20 students** - **The practical part of this course is given in well-equipped Lab which can**

accommodate up to 20 students.

2. Computing resources (AV, data show, Smart Board, software, etc.) - **Podium with internet connection**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

G Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching - **Two questionnaires answered by all students one on evaluating the course and other on instructor teaching.** - **Direct discussion with students.**
2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor **- Peer-to-peer review.** **- Opinion of faculty specialized in the field**
3. Processes for Improvement of Teaching **More IT technology**
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) **External reviewer**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. **- Peer to peer review** **-Curriculum Committee** **- External reviewer**

Dr. Mohamed Saad Daoud
Dr. Jihan Mesfer Meshref Al-Ghamdi

Signature: _____ **Date Report Completed: 16/10/2016**

Received by: _____ **Dean/Department Head**

Signature: _____ **Date: _____**