

Republic of Yemen  
Ministry of Higher Education & Scientific Research  
Emirates International University



Faculty of Dentistry  
Department of Basic science  
Doctor of Dental Surgery

Course Specification of Biochemistry II  
Course No. ( )



All Rights Reserved. Emirates International University.

Review committee:

Head of the Department

Quality Assurance head

Dean of Faculty



## I. Course Identification and General Information:

1	Course Title:	Biochemistry II			
2	Course Code & Number:				
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Biochemistry I			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Doctor of Dental Surgery			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Dentistry			
12	Prepared by:	Dr. Waled Al-Dubai			

## II. Course Description:

Biochemistry II Focuses on , metabolism of carbohydrates, lipids, proteins that provides students with information that help students in understanding mechanism of drugs action, diagnosis of diseases , and identifies causes of many diseases.

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs Learning out of program		
<b>A. Knowledge and Understanding:</b>		<b>I, A or E</b>		
a1	Describe the metabolic pathways of carbohydrates, lipids, proteins.	A	A1	Describe the scientific basis of dentistry and the relevant biomedical and behavioral sciences which form the basis for understanding human growth, development and health.
a2	Describe the digestion and absorption of carbohydrates, lipids, proteins.	A	A1	Describe the scientific basis of dentistry and the relevant biomedical and behavioral sciences which form the basis for understanding human growth, development and health.
a3	Identify the biochemical causes of metabolic disorders	A	A1	Describe the scientific basis of dentistry and the relevant biomedical and behavioral sciences which form the basis for understanding human growth, development and health.
<b>B. Intellectual Skills:</b>				
b1	Correlate between causes and symptoms, and biochemical laboratory results of metabolic disorders	A	B1	Incorporate theoretical basic biomedical, behavioral and dental sciences with the clinical signs and symptoms for appropriate understanding of disease and its management.
b2	Interpret abnormal biochemical tests results and analyze source of lab errors	A	B2	Apply critical thinking and evidence-based problem solving when providing patient's care.
<b>C. Professional and Practical Skills:</b>				
c1	Perform lab tests like measurement of glucose or uric acid that are important for detection of metabolic disorders	A	C1	Obtain and record a comprehensive history, perform an appropriate physical examination, and carry out different investigations to reach a correct diagnosis and treatment.
c2	Apply biohazard management and	A	C3	Apply infection control and radiation





	quality during performing lab tests			protection according to international standards.
<b>D. Transferable Skills:</b>				
d1	Use computer and internet to get information		D2	Use advanced information and communication technologies to enrich and diversify professional experience
d2	Work effectively alone and as part of a team		D3	Demonstrate leadership and teamwork skills with colleagues and other oral health team for effective delivery of oral health care.
d3	Demonstrate the skills required for self-learning to remain updated with dental practice		D1	Commit to continuous education, self-development and lifelong learning to remain updated with advances in dental practice.

<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Describe the metabolic pathways of carbohydrates, lipids, proteins.	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Presentation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Midterm Exam</li> <li>▪ Final Exam</li> </ul>
a2	Describe the digestion and absorption of carbohydrates, lipids, proteins.	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Presentation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Midterm Exam</li> <li>▪ Final Exam</li> </ul>
a3	Identify the biochemical causes of metabolic disorders	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Presentation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Midterm Exam</li> <li>▪ Final Exam</li> </ul>
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Correlate between causes and symptoms, and biochemical laboratory results of metabolic	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Discussion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Midterm Exam</li> <li>▪ Final Exam</li> </ul>

	disorders		
b2	Interpret abnormal biochemical tests results and analyze source of lab errors	<ul style="list-style-type: none"> <li>▪ Lectures</li> <li>▪ Discussion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Quizzes</li> <li>▪ Midterm Exam</li> <li>▪ Final Exam</li> </ul>
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Perform lab tests like measurement of glucose or uric acid that are important for detection of metabolic disorders	<ul style="list-style-type: none"> <li>▪ Discussion</li> <li>▪ Lab Experiments</li> </ul>	<ul style="list-style-type: none"> <li>▪ Direct observation</li> <li>▪ Practical Exam</li> </ul>
c2	Apply biohazard management and quality during performing lab tests	<ul style="list-style-type: none"> <li>▪ Discussion</li> <li>▪ Lab Experiments</li> </ul>	<ul style="list-style-type: none"> <li>▪ Direct observation</li> <li>▪ Practical Exam</li> </ul>
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Use computer and internet to get information	<ul style="list-style-type: none"> <li>▪ Discussion</li> <li>▪ Self-Learning</li> <li>▪ Presentation</li> <li>▪ Seminars</li> </ul>	<ul style="list-style-type: none"> <li>▪ Research</li> <li>▪ Homework</li> <li>▪ Group work</li> <li>▪ Direct observation</li> </ul>
d2	Work effectively alone and as part of a team	<ul style="list-style-type: none"> <li>▪ Discussion</li> <li>▪ Self-Learning</li> <li>▪ Presentation</li> <li>▪ Seminars</li> </ul>	<ul style="list-style-type: none"> <li>▪ Research</li> <li>▪ Homework</li> <li>▪ Group work</li> <li>▪ Direct observation</li> </ul>
d3	Demonstrate the skills required for self-learning to remain updated with dental practice	<ul style="list-style-type: none"> <li>▪ Discussion</li> <li>▪ Self-Learning</li> <li>▪ Presentation</li> <li>▪ Seminars</li> </ul>	<ul style="list-style-type: none"> <li>▪ Research</li> <li>▪ Homework</li> <li>▪ Group work</li> <li>▪ Direct observation</li> </ul>



IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	<b>Carbohydrate metabolism</b>	<ul style="list-style-type: none"> <li>-Digestion and absorption of carbohydrates</li> <li>-Glycolysis and oxidative decarboxylation of pyruvate</li> <li>-Citric acid cycle</li> <li>-Gluconeogenesis</li> <li>-Glycogen metabolism and their disorders</li> <li>-Diabetes mellitus</li> <li>-HMP shunt</li> </ul>	5	10	a1, a2,a3, b1
2	<b>Lipid metabolism 1</b>	<ul style="list-style-type: none"> <li>-Digestion and absorption of lipids</li> <li>-Fate of absorbed lipids</li> <li>-Lipolysis and fatty acids biosynthesis</li> <li>-Oxidation of fatty acids</li> </ul>	2	4	a1, a2,a3, b1
3	<b>Midterm Exam</b>	MCQs and essay questions	1	2	a1, a2,a3, b1
	<b>Lipid metabolism 2</b>	<ul style="list-style-type: none"> <li>- Ketogenesis and ketolysis</li> <li>-Metabolism of cholesterol and its disorders</li> <li>-Lipoprotein metabolism</li> </ul>	2	4	a1, a2,a3, b1
4	<b>Proteins and nucleic acid metabolism</b>	<ul style="list-style-type: none"> <li>-Digestion and absorption of proteins</li> <li>-Fate of absorbed amino acids</li> <li>-Catabolic reactions of amino acids and their clinical application</li> <li>4-Source and fate of ammonia</li> <li>-Transport of ammonia</li> <li>-Urea cycle</li> <li>-Disorders of hyperammonemia and their treatment</li> <li>-Mechanism of hyperammonemia</li> </ul>	5	10	a1, a2,a3, b1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		toxicity -Inborn errors of amino acid metabolism -Purine and pyrimidine metabolism			
6	Final Exam	-MCQs and essay questions	1	2	a1, a2,a3, b1
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

**B. Case Studies and Practical Aspect:**

No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Biohazards management	3 <sup>rd</sup> ,4 <sup>th</sup> *	4	c2
2	-Spectrophotometer: Components, Principle, operation, types, and its applications	5 <sup>th</sup> ,6 <sup>th</sup>	4	c1
3	- Measurement of glucose in blood	7 <sup>th</sup>	2	b1,b2, c1, c2
4	- Measurement of total proteins and albumin	8 <sup>th</sup>	2	b1,b2, c1, c2
5	- Measurement of lipid profile: Total cholesterol, Triglycerides, LDL-cholesterol, HDL-cholesterol.	9 <sup>th</sup> , 10 <sup>th</sup>	4	b1,b2, c1, c2
6	- Measurement of urea and creatinine	11 <sup>th</sup>	2	b1,b2, c1, c2
7	- Measurement of uric acid	12 <sup>th</sup>	2	b1,b2, c1, c2
8	- Review	13 <sup>th</sup> -14 <sup>th</sup>	4	b1,b2, c1, c2



No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
9	- Practical test	15 <sup>th</sup>	2	b1,b2, c1, c2
<b>Number of Weeks /and Units Per Semester</b>		<b>13</b>	<b>26</b>	

### V. Teaching Strategies of the Course:

- Lectures
- Discussion
- Self-Learning
- Presentation
- Seminars
- Lab Experiments

### VI. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Exam
- Practical Exam
- Research
- Homework
- Group work
- Direct observation

### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	<b>Assignment :</b> Searching information about related subjects of biochemistry	10 <sup>th</sup>	5	d1, d2,d3
<b>Total</b>			<b>5</b>	



### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	10 <sup>th</sup>	5	5%	d1, d2,d3
2	Quizzes	5 <sup>th</sup>	5	5%	a1,a2, a3,b1
3	Midterm Exam	8 <sup>th</sup>	20	20%	a1, a2,a3, b1
4	Practical Exam	15 <sup>th</sup>	20	20%	b1,b2, c1, c2
5	Final Exam	16 <sup>th</sup>	50	50%	a1, a2,a3, b1
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ):

- 1- Victor, R.W., David, A.B., Kathleen, M.B., Peter, j. k., Anthony, P.W (2012). Harper's Illustrated Biochemistry.29<sup>st</sup> edn. United States : McGraw-Hill Education
- 2-Al-Dubai W .Medical biochemistry (part 2). 2<sup>nd</sup> edn, Yemen:Dar Althakafa Al-asreeia

#### 2- Essential References:

- 1- David, L. N., Michael, M. C (2013) Lehninger principles of biochemistry.6th edn. England: Macmillan Higher Education.
- 2- Michael, L., Alisa, P (2014) Marks' Essentials of Medical Biochemistry: A Clinical Approach. 2nd edn. China: Wolters Kluwer.

#### 3- Electronic Materials and Web Sites etc.:

##### Websites:

- 3- Biochemistry Courses

<https://www.edx.org/learn/biochemistry>

- 4- Biochemistry: Free For All

<https://open.umn.edu/opentextbooks/textbooks/biochemistry-free-for-all-ahern>

### X. Course Policies: (Based on the Uniform Students' By law (2007)

#### Class Attendance:

- 1 Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.

2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



## Faculty of Dentistry

### Department of Basic science

### Doctor of Dental Surgery

## Course Plan (Syllabus) of Biochemistry II

Course No. ( )

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Waled Al-Dubai	Office Hours					
Location & Telephone No.:	Sana'a 733872358	4 Hours Weekly					
		1	1		1		1
E-mail:	walidw2001@yahoo.com	SAT	SUN	MON	TUE	WED	THU

## II. Course Identification and General Information:

1	Course Title:	Biochemistry II			
2	Course Code & Number:				
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	2nd Level / 1st Semester			
5	Pre –Requisite (if any):	Biochemistry I			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Doctor of Dental Surgery			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Dentistry			
12	Prepared by:	Dr. Waled Al-Dubai			

## III. Course Description:

Biochemistry II Focuses on , metabolism of carbohydrates, lipids, proteins that provides students with information that help students in understanding mechanism of drugs action, diagnosis of diseases , and identifies causes of many diseases.



#### IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	<b>A. Knowledge and Understanding:</b>
a1	Describe the metabolic pathways of carbohydrates, lipids, proteins.
a2	Describe the digestion and absorption of carbohydrates, lipids, proteins.
a3	Identify the biochemical causes of metabolic disorders
	<b>B. Intellectual Skills:</b>
b1	Correlate between causes and symptoms, and biochemical laboratory results of metabolic disorders
b2	Interpret abnormal biochemical tests results and analyze source of lab errors
	<b>C. Professional and Practical Skills:</b>
c1	Perform lab tests like measurement of glucose or uric acid that are important for detection of metabolic disorders
c2	Apply biohazard management and quality during performing lab tests
	<b>D. Transferable Skills:</b>
d1	Use computer and internet to get information
d2	Work effectively alone and as part of a team
d3	Demonstrate the skills required for self-learning to remain updated with dental practice

#### V. Course Contents:

##### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Carbohydrate metabolism</b>	-Digestion and absorption of carbohydrates -Glycolysis and oxidative decarboxylation of pyruvate -Citric acid cycle -Gluconeogenesis -Glycogen metabolism and their disorders -Diabetes mellitus -HMP shunt	5	10

## V. Course Contents:

### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
2	Lipid metabolism 1	-Digestion and absorption of lipids -Fate of absorbed lipids -Lipolysis and fatty acids biosynthesis -Oxidation of fatty acids	2	4
3	Midterm Exam	MCQs and essay questions	1	2
	Lipid metabolism 2	- Ketogenesis and ketolysis -Metabolism of cholesterol and its disorders -Lipoprotein metabolism	2	4
4	Proteins and nucleic acid metabolism	-Digestion and absorption of proteins -Fate of absorbed amino acids -Catabolic reactions of amino acids and their clinical application 4-Source and fate of ammonia -Trnsport of ammonia -Urea cycle -Disorders of hyperammonemia and their treatment -Mechanism of hyperammonemia toxicity -Inborn errors of amino acid metabolism -Purine and pyrimidine metabolism	5	10
6	Final Exam	-MCQs and essay questions	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

### B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Week Due	Contact Hours
1	Biohazards management	3 <sup>rd</sup> , 4 <sup>th</sup> *	4
2	-Spectrophotometer: Components, Principle, operation, types, and its applications	5 <sup>th</sup> 6 <sup>th</sup>	4



<b>B. Case Studies and Practical Aspect:</b>			
No.	Tasks/ Experiments	Week Due	Contact Hours
3	- Measurement of glucose in blood	7 <sup>th</sup>	2
4	- Measurement of total proteins and albumin	8 <sup>th</sup>	2
5	- Measurement of lipid profile: Total cholesterol, Triglycerides, LDL-cholesterol, HDL-cholesterol.	9 <sup>th</sup> , 10 <sup>th</sup>	4
6	- Measurement of urea and creatinine	11 <sup>th</sup>	2
7	- Measurement of uric acid	12 <sup>th</sup>	2
8	- Review	13 <sup>th</sup> -14 <sup>th</sup>	4
9	- Practical test	15 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>		<b>13</b>	<b>26</b>

### VI. Teaching Strategies of the Course:

- Lectures
- Discussion
- Self-Learning
- Presentation
- Seminars
- Lab Experiments

### VII. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Exam
- Practical Exam
- Research
- Homework
- Group work
- Direct observation

### VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Assignment : Searching information about related subjects of biochemistry	10th	5
<b>Total</b>			<b>5</b>

### IX. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	10 <sup>th</sup>	5	5%
2	Quizzes	5 <sup>th</sup>	5	5%
3	Midterm Exam	8 <sup>th</sup>	20	20%
4	Practical Exam	15 <sup>th</sup>	20	20%
5	Final Exam	16 <sup>th</sup>	50	50%
<b>Total</b>			<b>100</b>	<b>100%</b>

### X. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ):

Victor, R.W., David, A.B., Kathleen, M.B., Peter, j. k., Anthony, P.W (2012). Harper's Illustrated Biochemistry.29st edn. United States : McGraw-Hill Education  
2-AI-Dubai W .Medical biochemistry (part 2). 2nd edn, Yemen:Dar Althakafa Al-asreeia

#### 2- Essential References:

David, L. N., Michael, M. C (2013) Lehninger principles of biochemistry.6th edn. England: Macmillan Higher Education.  
Michael, L., Alisa, P (2014) Marks' Essentials of Medical Biochemistry: A Clinical Approach. 2nd edn. China: Wolters Kluwer.

#### 3- Electronic Materials and Web Sites etc.:

##### Websites:

Biochemistry Courses





<https://www.edx.org/learn/biochemistry>

Biochemistry: Free For All

<https://open.umn.edu/opentextbooks/textbooks/biochemistry-free-for-all-ahern>

## XI. Course Policies: (Based on the Uniform Students' Bylaw (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.