



Course Specification of Physiology

Course Code (BE161)

I. Course Identification and General Information:						
1	Course Title:	Physiology				
2	Course Code & Number:	BE161				
3	Credit hours:	C.H			TOTAL	
		Th.	Seminar	Pr		Tr.
		2	--	2	--	3
4	Study level/ semester at which this course is offered:	2 nd Level / 1 st Semester				
5	Pre –requisite (if any):	Biology				
6	Co –requisite (if any):	None				
7	Program (s) in which the course is offered:	Biomedical Engineering Program				
8	Language of teaching the course:	English				
9	Location of Teaching the Course:	Faculty of Engineering				
10	Prepared by:	Dr. Sadeq Abdulmogni				
11	Reviewed by:	Dr. Mohammed Al-Olofi				
12	Date of Approval:					

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



I. Course Description:

Human Physiology familiarizes students with basic definitions and principles related to physiology. The course emphasizes the concept of internal environment and homeostasis and the concept of feedback in a biological system. It also helps students to understand body fluid and cellular physiology. The course gives an overview on the physiology and functions of blood, cardiovascular, respiratory, endocrine, digestive and renal systems. It prepares students to understand future disease processes and pathophysiology.

III. Course Intended learning outcomes (CILOs) of the course (maximum 8CILOs)	Referenced PILOs (Only write code number of referenced Program Intended learning outcomes)
Knowledge and Understanding: Upon successful completion of the undergraduate Biomedical Engineering Program, the graduates will be able to:	
a1	Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.
a2	Understand physiology of the cardiovascular system and role of kidney in homeostasis.
B. Cognitive/ Intellectual Skills: Upon successful completion of the undergraduate Biomedical Engineering Program, the graduates will be able to:	
	A1 Describe and explain the underlying mathematical methods and theories; life scientific-principles; and engineering core concepts related to the Biomedical Engineering context.
	A2 Clarify the design principles and techniques and the engineering materials characteristics and how these are relevant to the developments and technologies in a biomedical systems context.

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



b1	Distinguish between physiological and pathological performance of body cells.	B1 Apply engineering principles; basic of life-science; mathematical theories; and modern tools professionally in modelling, analyzing, designing, and constructing physical digital systems; devices and/or processes relevant to Biomedical Engineering fields.
b2	Integrate physiology with other sciences	B4 Consider the principles of management and its various functions to work professionally in Biomedical Engineering fields.
<p>C. Professional and Practical Skills: Upon successful completion of the undergraduate Biomedical Engineering Program, the graduates will be able to:</p>		
c1	Determine the requirements of homeostasis.	C1 Apply integrally knowledge of mathematics, life science, IT, design, business context and engineering practice to solve problems and to design systems/processes relevant to Biomedical Engineering.
c2	Reform hematological analysis related to units.	C2 Use a wide range of analytical tools, techniques, IT, modern engineering tools, software packages and develop required computer programs to solve, modeling and analyzing Biomedical Engineering problems.
<p>D. Transferable Skills: Upon successful completion of the undergraduate Biomedical Engineering Program, the graduates will be able to:</p>		
d1	Work separately or in a team to research and prepare a scientific topic.	D1 Lead and motivate individuals, show capability to work in stressful environments and within constraints, collaborate effectively within multidisciplinary team.

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.	<ul style="list-style-type: none"> • Interactive lectures & examples, • Presentation • Interactive class discussions, 	<ul style="list-style-type: none"> • Written tests (mid and final terms and quizzes),
a2. Understand physiology of the cardiovascular system and role of kidney in homeostasis.	<ul style="list-style-type: none"> • Interactive lectures & examples, • Presentation • Interactive class discussions, 	<ul style="list-style-type: none"> • Written tests (mid and final terms and quizzes),

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Distinguish between physiological and pathological performance of body cells.	<ul style="list-style-type: none"> • Interactive lectures & examples, • Presentation • Interactive class discussions, 	<ul style="list-style-type: none"> • Written tests (mid and final terms and quizzes),
b2. Integrate physiology with other sciences	<ul style="list-style-type: none"> • Interactive lectures & examples, • Presentation • Interactive class discussions, 	<ul style="list-style-type: none"> • Written tests (mid and final terms and quizzes),

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



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(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Determine the requirements of homeostasis.	-Lectures -Lab Experiments	-Practical reports - Final Practical Exam
c2. Reform hematological analysis related to units.	-Lectures -Lab Experiments	-Practical reports - Final Practical Exam

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1 Work separately or in a team to research and prepare a scientific topic.	- Discussion - Self Learning - Presentation	Oral discussion.

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Physiology definition & organization of the cell	a1	Functional morphology of the cell Transport across cell membranes Functional systems of the cell that make it a living	1-2	4

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University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



			organism.		
2	Body fluids, compartments, composition & functions.	a1,a2, b2,c1, d1	<ul style="list-style-type: none"> - Distribution of body fluid - Functions of water - Osmosis, osmolality, isotonicity & body water balance. 	3-4	4
3	1- Composition and functions of the blood. 2- RBCs, Formation and general functions	a1, a2 b1,b2	<ul style="list-style-type: none"> - Composition of blood: - Plasma - Blood elements - Functions of blood - Red blood corpuscles - Erythropoiesis and factors affecting it - Anemia: Types of anemia 	5-7	6
4	Mid-Term Theoretical Exam	a1,a2, b1, d2	- MCQs and essay questions	8	2
5	cardiovascular system	a1, a2, b1,b2, c1, c2	-Physiological anatomy of heart - -Blood pressure and factor Determining and maintaining it.	9-10	4
6	Endocrine system	a1, a2, b1,b2, c1, c2, d2	Introduction to endocrine system Mechanism of action of	11	2

University of Sana'a
 Faculty of Engineering
 Department: Biomedical Engineering
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			hormones Endocrine glands and their functions.		
7	The kidney	a1,a2, b2,c1, d1	Functional anatomy of the kidneys.	12	2
8	Respiratory system.	a1,a2, a3 b1, d2	Functions of respiratory system	13	2
9	Digestive system.	a1, a2 b1,b2	Functions of gastrointestinal tract. – Functions of liver	14-15	4
10	Final Theoretical Exam	a1,a2, a3 b1, d2, c3	MCQs and essay questions	16	2
Number of Weeks /and Units Per Semester				16	32

B - Practical Aspect: (if any)				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Separation of the blood	1	2	a1, a2 b1,b2, c1
2	Measurement of the hemoglobin.	2	2	a1, a2 b1,b2,c2,
3	- Erythrocyte sedimentation rate (ESR)	3	2	a1, a2, b1,b2, c1,c2
4	- The hematocrit	4	2	a1, a2, b1,c1,c2

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Department: Biomedical Engineering
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	(H)			
5	- Bleeding time and Clotting time	5	2	a1, a2, b1,b2, c1,
6	- Blood groups	6	2	a1, b1,b2, c1,c2
7	- The white blood cells	7	2	a1, a2, b1, c1
8	- Measurement of blood pressure	8-9	4	a1, a2 b1,b2,c2, c3
9	ECG	10	2	a1, a2, b1,c1,c2
10	- Pulse	11	2	a1, a2, b1,b2, c1, c2, c3
11	- Body temperature	12	2	a1, b1,b2, c1,c2
12	- Pulmonary functions test.	13	2	a1, a2, b1,b2, c1, c2
13	Final practical test	14	2	b2,c1,c2 d1,d2
Number of Weeks /and Units Per Semester 14			30	

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V. Teaching Strategies of the Course:

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

VI. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Written Exam
- Final Practical Exam
- Homework
- Group work

VII. Assignments:

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1				
2				
3				
Total				10



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	Quizzes 1 & 2	4 & 12	10	10 %	a1, a2
2	Mid-Term Theoretical Exam	8	20	20%	a1, a2, b1, b2,
3	Mid-Term Practical Exam	9	5	5%	a1, a2, b1, b2
4	Final Practical Exam including Project Presentation & Evaluation	14	15	15 %	c1, c2,d1, d2
5	Final Theoretical Exam	16	50	50%	a1, a2, b1, b2
Total			100	100%	

IX. Learning Resources:	
1- Required Textbook(s) (maximum two).	
	1. Guyton and Hall 2010, Text book of medical physiology, 12th Ed, Mississippi Medical Center, Jackson, Mississippi, USA 2. Laurie Kelly 2005, , Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series
2- Essential References.	
	1. Kelly 2018 , Essential of Human physiology. 8th edition. 2. Fox Human physiology, 10th edition, 2010.

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
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	<p>3. Kaplan Medical step 1 physiology, 6th edition, 2006.</p> <p>4. Mader understanding Human anatomy and physiology, 5th edition, 2004.</p>
3- Electronic Materials and Web Sites etc.	
	<p>Websites:</p> <p>1- www.csun.edu/science/biology/anatomy/anatomy.html</p> <p>2- www.cliffsnotes.com</p> <p>3- www.innerbody.com</p> <p>4- www.anatomyandphysiology.com/</p> <p>5- www.mhhe.com/biosci2/anatomyrevealed</p>

X. Course Policies:	
1	<p>Class Attendance:</p> <p>A student should attend not less than 75 % of total hours of the subject; otherwise he/she will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic. If the absent is more than 25% of a course total contact hours, student will be required to retake the entire course again.</p>
2	<p>Tardy:</p> <p>For late in attending the class, the student will be initially notified. If he repeated lateness in attending class, he/she will be considered as absent.</p>
3	<p>Exam Attendance/Punctuality:</p> <p>A student should attend the exam on time. He/she is permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam</p>
4	<p>Assignments & Projects:</p> <p>In general one assignment is given to the students after each chapter; the student has to submit</p>

University of Sana'a
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	all the assignments for checking on time, mostly one week after given the assignment.
5	<p>Cheating:</p> <p>For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.</p>
6	<p>Plagiarism:</p> <p>Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he/she will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university or according to the university roles.</p>
7	<p>Other policies:</p> <ul style="list-style-type: none"> - Mobile phones are not allowed to use during a class lecture. It must be closed; otherwise the student will be asked to leave the lecture room. - Mobile phones are not allowed in class during the examination. - Lecture notes and assignments might be given directly to students using soft or hard copy.



Template for Course Plan (Syllabus) OF

physiology BE161

I. Course Identification and General Information:				
1	Course Title:	Physiology		
2	Course Code & Number:	BE161		
3	Credit Hours:	Credit Hours	Theory Hours	Lab. Hours
			Lecture	Exercise
		3	2	--
4	Study Level/ Semester at which this Course is offered:	2 nd Level / 1 st Semester		
5	Pre –Requisite (if any):	Biology		
6	Co –Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Bachelor of Biomedical Engineering		
8	Language of Teaching the Course:	English		
9	Location of Teaching the Course:	Faculty of Engineering		
10	Prepared by:	Dr. Sadeq Abdulmogni		
11	Reviewed by:	Dr. Mohammed Al-Olofi		
12	Date of Approval:			

II. Course Description:

Human Physiology familiarizes students with basic definitions and principles related to physiology The course emphasizes the concept of internal environment and

University of Sana'a
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homeostasis and the concept of feedback in a biological system. It also helps students to understand body fluid and cellular physiology. The course gives an overview on the physiology and functions of blood, cardiovascular, respiratory, endocrine, digestive and renal systems. It prepare student to understand future disease process and pathophysiology.

III. Course Intended Learning Outcomes (CILOs): (مخرجات تعلم المقرر)	
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:	
a1	Describe the functions of the different organelles in the human cell, and describe the transport system across the cell membranes.
a2	Understand physiology of the cardiovascular system and role of kidney in homeostasis.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Distinguish between physiological and pathological performance of body cells.
b2	Integrate physiology with other sciences
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Determine the requirements of homeostasis.
c2	Reform hematological analysis related to units.
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Work separately or in a team to research and prepare a scientific topic.

University of Sana'a
Faculty of Engineering
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IV. Course Contents:				
A. Theoretical Aspect:				
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Physiology definition & organization of the cell	Functional morphology of the cell Transport across cell membranes Functional systems of the cell that make it a living organism.	1-2	4
2	Body fluids, compartments, composition & functions.	– Distribution of body fluid – Functions of water – Osmosis, osmolality, isotonicity & body water balance.	3-4	4
3	1- Composition and functions of the blood. 2- RBCs, Formation and general functions	– Composition of blood: – Plasma – Blood elements – Functions of blood – Red blood corpuscles – Erythropoiesis and factors affecting it – Anemia: Types of anemia	5-7	6
4	Mid-Term Theoretical Exam	– MCQs and essay questions	8	2
5	cardiovascular system	-Physiological anatomy of heart - -Blood pressure and factor Determining and maintaining it.	9-10	4
6	Endocrine system	Introduction to endocrine system Mechanism of action of hormones Endocrine glands and their functions.	11	2



IV. Course Contents:				
A. Theoretical Aspect:				
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
7	The kidney	Functional anatomy of the kidneys.	12	2
8	Respiratory system.	Functions of respiratory system	13	2
9	Digestive system.	Functions of gastrointestinal tract. – Functions of liver	14-15	4
10	Final Theoretical Exam	MCQs and essay questions	16	2
Number of Weeks /and Units Per Semester			16	32

B. Case Studies and Practical Aspect:			
No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	Separation of the blood	1	2
2	Measurement of the hemoglobin.	2	2
3	- Erythrocyte sedimentation rate (ESR)	3	2
4	- The hematocrit (H)	4	2
5	- Bleeding time and Clotting time	5	2
6	- Blood groups	6	2

University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
Title of the Program: Biomedical Engineering



B. Case Studies and Practical Aspect:			
No.	Tasks/ Experiments	Number of Weeks	Contact Hours
7	- The white blood cells	7	2
8	- Measurement of blood pressure	8-9	4
9	ECG	10	2
10	- Pulse	11	2
11	- Body temperature	12	2
12	- Pulmonary functions test.	13	2
13	Final practical test	14	2
Number of Weeks /and Units Per Semester		14	28

C. Tutorial Aspect:			
No.	Tutorial	Number of Weeks	Contact Hours
1			
Number of Weeks /and Units Per Semester			

V. Teaching Strategies of the Course:
<ul style="list-style-type: none"> - Lectures - Discussion - Self Learning - Presentation - Seminars



V. Teaching Strategies of the Course:

- Lab Experiments

VI. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Written Exam
- Final Practical Exam
- Homework
- Group work

VII. Assignments:

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1				
2				
3				
Total				10



VIII. Schedule of Assessment Tasks for Students During the Semester:				
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Quizzes 1 & 2	4 & 12	10	10 %
2	Mid-Term Theoretical Exam	8	20	20%
3	Mid-Term Practical Exam	9	5	5%
4	Final Practical Exam including Project Presentation & Evaluation	14	15	15 %
5	Final Theoretical Exam	16	50	50%
Total			100	100%

IX. Learning Resources:
<ul style="list-style-type: none"> Written in the following order: <ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).
<p>Example</p> <p>1- Niku, Saeed B., 2011, Introduction to Robotics: Analysis, Control, Applications, 2nd Edition, USA, Wiley.</p>
<p>1- Required Textbook(s) (maximum two):</p> <p>1- Guyton and Hall 2010, Text book of medical physiology, 12th Ed, Mississippi Medical Center, Jackson, Mississippi, USA</p> <p>2- Laurie Kelly 2005, , Essentials of Human Physiology for Pharmacy, 1st Ed. CRC Press, Pharmacy Education series</p>
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University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
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3- Electronic Materials and Web Sites etc.:

Websites:

- 5- www.csun.edu/science/biology/anatomy/anatomy.html
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University of Sana'a
Faculty of Engineering
Department: Biomedical Engineering
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