

Course Specification of General Anatomy

I. Course Identification and General Information:					
١	Course Title:	Anatomy ٢			
٢	Course Code & Number:	B1102223			
٣	Credit hours: 14	C.H			TOTAL
		Th.	Seminar	Pr	
		2		2	
٤	Study level/ semester at which this course is offered:	1 st year / 1 st & 2 nd semester			
٥	Pre -requisite (if any):	Nil			
٦	Co -requisite (if any):	Nil			
7	Program (s) in which the course is offered:	Bachelor of Medical lab, Nursing & Pharma D			
8	Language of teaching the course:	English			
9	Location of teaching the course:	Thamar University			
10	Study System	Attendance			
11	Prepared By:	Ass.Prof.Dr.Saleh Nasser Saleh Alkardae			
12	Name of faculty member responsible for the course	Ass.Prof.Dr.Saleh Nasser Saleh Alkardae			
13	Date of Approval				

II. Course Description:

This course provides a core body of scientific knowledge concerning the normal structure and function of the human body at the level of organ and organ system. The student must be familiar with bones, muscles, joints, blood vessels and nerve. The emphasis will be placed on, but not limited to, the hierarchy of structural organization, medical terminology, musculoskeletal, cardiovascular, and respiratory systems as well as system relationships. It will provide the foundation to prepare the student for upcoming courses and practical experiences.

III. Course Objectives:

1. Explain the organization of the human body.
2. Recognize the major anatomical structures of the human body.
3. Describe the systems and processes involved in maintaining life and homeostasis in the human body.

A) Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs

After completing this program, students would be able to:

b1 Correlate the function of organs within the system with anatomy

Intellectual Skills CILOs

After completing this course, students would be able to:

b1 Correlate the function of organs within the system with anatomy

b2	Interprets some clinical findings in relation to anatomical landmarks	b2	Interprets some clinical findings in relation to anatomical landmarks
-----------	--	-----------	--

B) Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Professional and Practical Skills PILOs		Professional and Practical Skills CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
c1	Show the anatomical parts of different body systems and their relations on plastic models and cadavers	c1	Show the anatomical parts of different body systems and their relations on plastic models and cadavers
c2	Draw various courses of the nerves & blood vessels	c2	Draw various courses of the nerves & blood vessels

C) Transferable (General) Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Transferable (General) Skills PILOs		Transferable (General) Skills CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
d1	Use information technology as a mean of communication, for data collection and analysis, and for self-directed learning	d1	Use information technology as a mean of communication, for data collection and analysis, and for self-directed learning
d2	Communicate with his colleagues, professors, instructors in a scientific way in the science of anatomy.	d2	Communicate with his colleagues, professors, instructors in a scientific way in the science of anatomy.

IV. Alignment Course Intended Learning Outcomes

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a 1	<ul style="list-style-type: none"> - Lectures - Multimedia - Reading - Illustration - Discussions 	<ul style="list-style-type: none"> - Lectures - Multimedia - Reading - Illustration - discussions
a 2	<ul style="list-style-type: none"> - Lectures - Multimedia 	<ul style="list-style-type: none"> - Lectures - Multimedia

	<ul style="list-style-type: none"> - Reading - Illustration - Discussions 	<ul style="list-style-type: none"> - Reading - Illustration - discussions
--	--	--

V. Course Intended Learning Outcomes (CILOs) :

D) Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs		Knowledge and Understanding CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
a 1	Define the Anatomical terms, osteology, Muscles, ligaments, tendons, Joint, fascia, Blood vessels and lymphatics.	a1.	Define the Anatomical terms, osteology, Muscles, ligaments, tendons, Joint, fascia, Blood vessels and lymphatics.
a 2	Describe the nervous system, respiratory system, gastrointestinal system, reproductive system, urinary system, endocrine system.	a 2	Describe the nervous system, respiratory system, gastrointestinal system, reproductive system, urinary system, endocrine system.

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

	Teaching strategies	Assessment Strategies
b1	<ul style="list-style-type: none"> - Interactive Lecture - Exercises - Discussions - Problem-Solving - Brainstorming 	<ul style="list-style-type: none"> - Written Examinations. - Problem-Solving - Exercises.
b2	Interactive Lecture Exercises Discussions Small-Group Learning Problem-Solving.	Recall/Factual Questions in Written exams, Oral evaluations, OSPE, Assignments, Quizzes

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course (ILOs)	Teaching strategies	Assessment Strategies
C1	<ul style="list-style-type: none"> - Audiovisual & lab sessions - Presentations - Multimedia 	<ul style="list-style-type: none"> - Active class - participation - Assignments
C2	<ul style="list-style-type: none"> - Practical Sessions - Exercises - Discussions 	<ul style="list-style-type: none"> - Written Examinations - Individual/Group Project - Technical/Practical

	<ul style="list-style-type: none"> - Problem-Solving - Individual/Group Project 	Reports /Presentations
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course (ILOs)	Teaching strategies	Assessment Strategies
D1	<ul style="list-style-type: none"> - Sessions - Presentations - Multimedia 	<ul style="list-style-type: none"> -Students activity - Assignments
D2	<ul style="list-style-type: none"> - Guided Individual Reading /Self Learning. - Presentation - Small-Group Learning 	

V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	No of Weeks	contact hours	Learning Outcomes (CILOs)
1	General introduction to Anatomy	General body organization and anatomical terminology body planes and cavities	1	2	a1,a2,b1,b2,c1,c2,d1,2
2	Bones, Skeletal Tissues, The Skeleton, Joints	Structure, Skeletal Tissues Functions, Classification of Bone. Anatomy of long bone. Axial v.s appendicular skeleton.	2	4	a1,,b2,c1,c2,d1,
3	Muscles, Muscle Tissues, The Muscular System	Structure, Types, Characteristics, Function Skeletal Muscle, Smooth Muscle, Cardiac Muscle Muscle System/Naming of Muscles	1	2	a1,a2,b1 ,c2,d1,
4	Cardiovascular system & Lymphatic System & Body Immunity	Blood vessels – large sized artery. Medium sized artery -large vein - Medium vein lymphatic vessels ,nodes, palatine tonsil, thymus & Spleen.	1	2	a1,a2,b1,b2,c1,c2,d1
5	Mid-term Exam		1	2	a1,a2,b1,b2,c1,c2
7	Digestive system	The components of GIT mouth, pharynx, esophagus, Stomach - fundus and pylorus. Small intestine - duodenum, jejunum & ileum; Large intestine – colon and appendix. Accessory digestive organs include the teeth, tongue, salivary glands, liver,	2	2	a2, b2,c1,c2,d1

		gallbladder, and pancreas.			
8	Respiratory System	consists of the nose, pharynx (throat), larynx (voice box), trachea (windpipe), bronchi, lungs and diaphragm.	1	2	a1,a2,b1,b2,c1,c2,d1
9	Uro-genital Systems	kidneys. Nephrons - cortical & juxtamedullary. Juxta glomerular apparatus Ureter, urinary bladder Male reproductive system testes Female reproductive system : Structure of ovary & Uterus	1	2	a1,a2,b1,b2,c1,c2,d1
10	Nervous system	The general organization of the central nervous tissue, the basic anatomical organization of the nervous system Spinal cord; Brain Stem. Cerebellum. Cerebral hemispheres – Autonomic nervous system	2	4	a1,,b2,c1,c2,d1,
11	Endocrine system	-Thyroid & parathyroid – Pituitary -Suprarenal gland. - Pancreas.	1	2	a2, b2,c1,c2,d1
12	Growth	Gametogenesis - spermatogenesis and oogenesis, fertilization implantation, germ layer formation, fetal membranes and placenta.	1	1	1 1 a2, b2,c1,c2,d1
14	- Final exam		1	2	a1,a2,b1,b2,c1,c2,d1,d2
Number of Weeks /and Units Per Semester 15 weeks				30	

B – Case Studies and Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Anatomical terms and osteology	2	4	a2,c1,d1,
2	Muscles, ligaments and tendons. Joint and fascia	1	1	a1,a2,b1,b2,c1,d1
3	The Integumentary System	1	2	a1,b1,c1,,d1,d2
4	Midterm practical exam	1	2	a1,a2,,b1,b2,c1,c2,d1,d2
5	Heart, Blood vessels and lymphatic's	2	2	a1,b1,c1,,d1,d2
6	Gastrointestinal system	2	4	a2,b1,b2,c1,d1
7	Nervous system	2	4	a1,b1,c1,,d1,d2
8	Respiratory system	1	2	a2,b1,b2,c1,d1
9	Reproductive system	1	2	a2,b1,b2,c1,d1
10	Urinary system	1	2	a1,a2,,b2,c1,d1,d2

11	Endocrine system	1	2	a2,b1,b2,c1,d1
12	Final practical exam	1	2	a1,a2,,b1,b2,c1,c2,d1,d2
Number of Weeks /and Units Per Semest5er 15			30	

VI. Teaching strategies of the course:

- Lectures
- Audiovisual & lab sessions
- Group work/ pair work
- Role play activities
- Enabled group discussion
- Brain storming
- Collaborative teaching techniques (with mixed and same ability groups)
- Critical questioning
- Tapping into prior knowledge
- Think pair share
- Reinforcements- homework
- Hand-outs, worksheets
- Power-point presentations/ reviews
- Presentations
- Group presentations
- Role play
- Participations
- Group discussions
- Question and answer session related to selected topics

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 2 micro report about of Musculoskeletal	a2,b2,c1,c2,d1,d2	2	1.25%
2	Assignment 2 micro report about of nervous system	a2,b2,c1,c2	4	1.25%
3	Assignment 3 micro-report CVS	a1,b1,c1,d2	7	1.25%
4	Assignment 3 micro-report Urogenital	a1,b2,c1,c2,d1	11	1.25%

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, oral & discussion notes	WEEKLY	10	10%	a1,a2,b1,b2,c1,c2,d1,
2	Assignments & Homework, Tasks & Presentation	2,4,7,11	5	5%	a1,a2,b1,b2,c1,d1,
3	Mid-Term exam	8	10	10%	a1,a2, b1 ,c1,c2,d1,d2
4	Final exam practical	14	15	15%	a1,a2,c1,d1
5	Final Exam theory	15	60	60%	a1,a2, b1 ,c1,c2,d1,d2

Total	100	100%	
IX. Learning Resources:			
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 			
1- Required Textbook(s) (maximum two).			
	1- Human Anatomy by Marieb, Wilhelm, Mallatt, 9th edition. Pearson. 2- Chummy S. Sinnatamby , 2011:Last's Anatomy: Regional and Applied (MRCS Study Guides) 12th Edition Churchill Livingstone.		
2- Essential References.			
	Richard Drake ,2020: Gray's Atlas of Anatomy (Gray's Anatomy) 3rd Edition, Churchill Livingstone 2- Harold Ellis, Vishy Mahadevan , 2018: Clinical Anatomy: Applied Anatomy for Students and Junior Doctors 14th Edition Wiley-Blackwe 3- Alan J. Detton ,2016: Grant's Dissector Sixteenth, North American Edition, LWW 4- Frank H. Netter, 2018: Atlas of Human Anatomy (Netter Basic Science) 7th Edition Elsevier 5- Anne M. R. Agur ,2019: Moore's Essential Clinical Anatomy 6th Edition, LWW; 6- LAWRENCE E. WINESKI ,2018: Snell's Clinical Anatomy by Regions 10th Edition LW 7- Rachel Koshi ,2017: Cunningham's Manual of Practical Anatomy VOL 2 Thorax and Abdomen (Oxford Medical Publications) 16th Edition Oxford University Press		
3- Electronic Materials and Web Sites etc.			
	http://free-books.us.to http://ebookfi.org http://libgen.info http://bookos.org/ www.wikipedia.org/wiki/ Journal of anatomy, American journal of anatomy, anatomical record and clinical anatomy		

IIX. Course Policies:	
1	Class Attendance: - Students must attend all the consultation sessions in class and constantly show individual progression until the week of deadline. 80% attendance is the basic requirement of this course. Students failing to meet this requirement will face a penalty of mark percentage deduction. Any progression checks after due dates will not be accepted, unless you have valid reasons with supportive documents.
2	Tardy: - <ul style="list-style-type: none"> The student will be regarded as absent if he or she is 10 minutes late in attending to the class. Absence from lectures and / or practical sessions shall not exceed 25%. Students who exceed this percentage limit without a medical or emergency excuse acceptable to and approved by the dean of the college shall not be allowed to enter the final examination.
3	Exam Attendance/Punctuality: - All examination and their roles will be according to students affairs regulations.
4	Assignments & Projects: - Assignments MUST be submitted on the due date handed personally to your module lecturer. Assignments can be submitted before the due date outside of class with the prior agreement of the lecturer.

	<p>Late Assignments / Extensions Work that is submitted after the due date will be PENALIZED. 2 marks will be deducted every subsequent day after failure to submit on the deadline set by the lecturers. Deduction applies on weekdays and Saturday. No work will be accepted after one week of delay from the deadline given, unless you have valid reasons with supportive documents. Extensions can only be granted if a student can show adequate progress towards completion of the assessment and there are extenuating circumstances preventing them from delivering the assessment on the due date. In the case of a request of an extension due to medical circumstances, students must produce an original medical certificate. The lecturer will only give extensions for a total amount of time not exceeding the equivalent number of days the medical certificate considered valid.</p>
5	<p>Cheating: - students who have been caught in any cheating case will be punished according to the students-affairs regulations.</p>
6	<p>Plagiarism: Plagiarism is a breach of intellectual property; the act of using or copying someone else's idea or work and trying to present it as your own. It is taking and using someone else's work without proper attribution. Intellectual Property involves: <ul style="list-style-type: none"> • Another person's idea, opinion, or theory • Any facts, statistics, graphs, drawings—any pieces of information—that are not common knowledge • Quotations of another person's actual spoken or written words • Paraphrase of another person's spoken or written words Issues of intellectual property extend beyond the written word of course. Bear in mind that the use of still images, moving images, audio or any other content which you have not created yourself, and which you do not have the appropriate permission to use, is an serious offence resulting in a FAIL grade for the subject</p>
7	<p>Other policies: -</p> <ul style="list-style-type: none"> • Using Internet Sources The World Wide Web has become a popular source of information for students' papers, and many questions have arisen about how to avoid plagiarizing these sources. In most cases, the same rules apply as for a printed source: when you refer to ideas or quote from a WWW site, you must cite that source. If you want to use visual information from a WWW site, many of the same rules apply. Copying visual information or graphics from a WWW site (or from a printed source) into a paper is very similar to quoting information, and the source of the visual information or graphic must be cited. These rules also apply to other uses of textual or visual information from WWW sites. • All the regulations and rules of study system in the university should be followed by students.

Course Specification

I. Course Identification and General Information:						
١	Course Title:	Physiology II				
٢	Course Code & Number:	B1102224				
٣	Credit hours:	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2		2		3
٤	Study level/ semester at which this course is offered:	Level 2, semester 1				
٥	Pre –requisite (if any):	Anatomy1, histology1, biochemistry1				
٦	Co –requisite (if any):	Anatomy,2, histology,2, biochemistry,2				
٨	Program (s) in which the course is offered:	Laboratories Medicine				
٩	Language of teaching the course:	English				
١٠	Location of teaching the course:	Tamar university, faculty of Medical Sciences				
11	Prepared By:	Dr. Adel Ali AMRAN				
12	Date of Approval					

II. Course Description:

This course provides student with the basic principles necessary to understand the function and organization of each system of our body and the integration between these systems to maintain the balance needed for life and also enable student to recognize the normal physiology of all body systems in order to differentiate between the normal and abnormal human body functions

III. Course Objectives:

Students should know the functional unit of each system

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
b1. Analyze different mechanisms for regulation of all body systems.	A7,B1,B2,4
b2. Integrate physiology with other basic and clinical sciences	A6,B1,B3

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
c1. Comprehend the general physiologic principles of the performance of the human body.	C7
c2. Perform a systematic examination of all the human systems	C5,C7
c3. Present physiological scientific data in a graphical form	B3,C7

Transferable (General) Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
d1. Work individually or in a team to research and prepare a scientific topic	D1
d2. Use available presentation aids (e.g Overhead Projectors or Data Show) to present clearly and effectively a scientific topic in a seminar, or the yearly scientific day.	D3

IV. Alignment Course Intended Learning Outcomes

(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 normal functions of the all human systems.	<ul style="list-style-type: none"> - Interactive lectures. - Video. 	<ul style="list-style-type: none"> - Quiz - Attendance
a2. Suggest the basic physiological measurements used to test different body functions	<ul style="list-style-type: none"> - Interactive lectures. - Video. - Seminars. 	<ul style="list-style-type: none"> - Quiz - Attendance - Seminars
a3. Introduce the concept of internal environment and homeostasis.	<ul style="list-style-type: none"> - Interactive lectures. - Video. - Seminar 	<ul style="list-style-type: none"> - Quiz - Attendance - Seminars

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Analyze different mechanisms for regulation of all body systems.	<ul style="list-style-type: none"> - Practical training in the lab. 	<ul style="list-style-type: none"> - Quiz - Attendance
b2. Integrate physiology with other basic and clinical sciences	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> - Practical exam - Reports

V. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
a1. Describe the normal functions of the all human systems.	A1,A2,A3,A4
a2. Suggest the basic physiological measurements used to test different body functions	
a3. Introduce the concept of internal environment and homeostasis.	

(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. support the theory and help students to comprehend the general physiologic principles of the performance of the human body	<ul style="list-style-type: none"> - Practical training in the lab. - 	<ul style="list-style-type: none"> - Quiz - Attendance - Practical exam - Reports
c2. Performing hematological tests		
c3. Present physiological scientific data in a graphical from		

(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 individually or in a team to research and prepare a scientific topic	<ul style="list-style-type: none"> - Seminar - Research topic 	Discussion Report
d2. Use available presentation aids (e.g Overhead Projectors or Data Show) to present clearly and effectively a scientific topic in a seminar, or the yearly scientific day.		

V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Cardiovascular system	<ul style="list-style-type: none"> - Design of the circulation - Functional anatomy of the heart - Heart muscle properties - Cardiac cycle - Heart sounds - Electrocardiography - The arterial system - The venous system - Regulation of the heart function - Cardiac output 	3	6	a1,a2

		<ul style="list-style-type: none"> - Arterial blood pressure - Hypertension and hypotension 			
2	Autonomic nervous system.	<ul style="list-style-type: none"> - Autonomic nervous system divisions - Functions of autonomic nervous system 	1	2	
2	Respiratory system	<ul style="list-style-type: none"> - Structure of the organs of Respiration - Respiratory mechanisms - Respiratory pressures - Pulmonary ventilation - Gas exchange and transport - Control of Respiration - Respiration disorders - Artificial respiration 	3	6	a1,a2
3	Urinary system.	<ul style="list-style-type: none"> - Urinary system consists - Functional anatomy of kidney - Urine, how is urine formed - iGlomerulus - filtration rate, tubular reabsorption and secretion - Artificial kidney - Factors influencing urine formation - Micturition - Regulation of renal function 	3	6	a3
4	Endocrine &Reproductive system	<ul style="list-style-type: none"> - Introduction to Hormones, Functions and hormones of - Pineal Gland, Pituitary gland, Thyroid, Parathyroid, Thymus, Pancreas and Adrenal glands. - Alterations in disease. - Female reproductive system- Menstrual cycle, function and hormones of ovary, oogenesis, fertilization, implantation, - Functions of breast - Male reproductive system - Spermatogenesis, - hormones and its functions, - semen 	3	6	a1,a2
5		<ul style="list-style-type: none"> - Physiology of GIT functions 	2	4	a1,a2,a3

	Gastrointestinal system	<p>of Month, salivary glands, pharynx, Small intestine.</p> <ul style="list-style-type: none"> - Digestion and absorption of Nutrients, carbohydrate, proteins AND lipids - Gastric secretions and control - Liver and pancreas - importance of bile - Functions of pancreatic - large intestine and rectum, defecation reflex - Enzymes and its roles <p>In digestion</p>			
	Med exam	-	1	2	
	Final exam	-	1	2	
Number of Weeks /and Units Per Semester				16	32

B – Case Studies and Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Stethography: Recording of Normal and Modified Movements of Respiration	2	4hr/ group	b1 c1,c2,c3 d1,d2
2	Determination of Breath Holding Time (BHT)	1	2hr/ group	
3	Spirometry (Determination of Vital Capacity, Peak Expiratory Flow Rate, and Lung Volumes and Capacities)	1	2hr/ group	
4	Artificial respiration	1	2hr/group	
5	Recording of Systemic Arterial Blood Pressure	1	2hr/ group	
6	Blood Pressure and Heart Rate Cardiac Efficiency Tests (Exercise Tolerance Tests) Demonstration of Carotid Sinus Reflex Demonstration of Venous Blood Flow Recording of Venous Pressure Demonstration of Triple Response Electrocardiography (ECG)	8	16hr/ group	

	Experiments on Student Physiography			
9	TESTS FOR HEARING	1	2/group	
11	Color Vision	1	2/group	
12	Visual acuity	1	2/group	
14	Med exam	1	2hr/ group	
Number of Weeks /and Units Per Semester			16	32

VI. Teaching strategies of the course:

1. Interactive lectures.
2. Video.
3. Seminars.
4. Practical training in the lab.

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Seminar			

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	Quiz	5	5	5%	a1- a4
2	Attendance	Continuous	5	5%	
3	Written Med-year Test	6	10	10%	a1- a4
4	Practical Med-year exam & Lab. Reports	7	5	5%	c1- c3
5	Practical Final exam	13	15	15%	c1- c3
	Final Exam (Oral & Written)	16	60	60%	a1-a4 b1-b2
Total			100	100%	

IX. Learning Resources:

- Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1- 1-K Sembulingam & Prema Sembulingam (2012) .6th ed. Essentials of Medical Physiology. Jaypee Brothers Medical Publishers
2- Guyton AC & Hall JE (2011) Textbook of Medical Physiology. 12 th ed. Philadelphia: Saunders
2- William F. Ganong (2009) Review of medical physiology. Twenty fourth edition..Mc Graw Hill. LIBRAIRE DU LIBAN

2- Essential References.

1- VANDER'S HUMAN PHYSIOLOGY: THE MECHANISMS OF BODY FUNCTION. 13th ed. McGraw-Hill. United States of America
2- Lectures notes

3- Electronic Materials and Web Sites etc.

1- online tutori2- http://www.bpsc.edu/sciencealliedhealth/humanphysiologylinks.html
1- MasteringA&P (www.masteringaandp.com)
2- www.learnsmartadvantagedemo.com

Biochemistry 2 Course Specification

Faculty: Faculty of Medical Sciences					
Program: Laboratory Medicine					
I. Course Identification and General Information:					
١	Course Title:	Biochemistry 2			
٢	Course Code &Number:	B1102242			
٣	Credit hours:	C.H			TOTAL
		Th.	Seminar	Pr	
		2		2	
٤	Study level/ semester at which this course is offered:	Level 2, first semester			
٥	Pre –requisite (if any):	B1102141			
٦	Co –requisite (if any):				
٨	Program (s) in which the course is offered:	MBBS, pharma D, laboratory medicine			
٩	Language of teaching the course:	English			
١٠	Location of teaching the course:	Thamar university, Faculty of Medical Sciences			
11	Prepared By:	Dr. Abdulqawi Al-Shammakh			
12	Date of Approval				

II. Course Description:

This course uses the knowledge and understanding gained in the biochemistry1 to provide students with an appreciation and an understanding of key metabolic biochemistry and molecular biology concepts. topics covered include concept of bioenergetics, digestion absorption, transporting and metabolism of carbohydrates, lipids, proteins and nucleic acids. The course enables students to understand metabolic pathways, tissue specific metabolism and its control and metabolic disorders. The course combines lectures, tutorials and practical. This practical component focusses on estimation of biomolecules related to carbohydrate, lipids and proteins and some metabolites associated with metabolic disorders.

III. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A1	a1-Explain the basic concept of bioenergetics, metabolic pathways, their integration and regulation.
A1, A3	a2-Describe the processes involved in the metabolism of carbohydrates, proteins, lipids, and nucleic acids.
A2	a3-Discuss the principle of chemical tests used in biochemistry laboratory and the factors affecting the accuracy of the results.
A1, A3	a4-Define inborn error of metabolism and determine the enzymes deficient and metabolites changes in different metabolic disorders.

Intellectual Skills:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1, B2	b1-Interpret the laboratory results of lipids carbohydrates and proteins and correlate them with other laboratory findings.
B1	b2-Transform the knowledge gained in biochemistry to practical application and understanding human diseases.
B4	b3-Select and assess the best laboratory investigation to verify and interpret the biochemical changes in health and in certain diseases.
B3	b4-Think critically and solve problems related to biochemical investigation.

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1	c1- Apply scientific methods for safety while working in the lab.
C3	c2- Collect, transport and analyze biological samples efficiently.
C4	c3- Perform biochemical tests using standard procedures ensuring producing reliable precise and accurate results.
C6	c4-Use manual and automated instrumentations and show awareness to their calibration and maintenance.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D5, D7	d1-Respect the ethical role of laboratory medicine and the role of organization.
D3, D4	d2-Acquire skills to use computer and communication technology to develop self-education and continuous long-life learning.
D1	d3-Work independently or in a team as a member or leader.
D2	d4-Communicate effectively with your teacher friends and other faculty staff.

IV.	I. Intended learning outcomes (ILOs) of the course: After completion of this course, the student should be able to:
	(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	Explain the basic concept of bioenergetics, metabolic pathways, their integration and regulation.	Active Lectures (supported with discussions), brain storm, tutorial	Written exam, Quiz,
a2	Describe the processes involved in the metabolism of carbohydrates, proteins, lipids, and nucleic acids.	Active Lectures (supported with discussions), tutorial, problem solving.	Written exam, Quiz, homework
a3	Discuss the principle of chemical tests used in biochemistry laboratory and the factors affecting the accuracy of the results.	Active Lectures, Tutorial, Animations and videos, Problem solving	Written exam Problem's evaluation , assignment
a4	Define inborn error of metabolism and determine the enzymes deficient and metabolites changes in different metabolic disorders.	Active Lectures (supported with discussions), Case study, tutorial	Written exam Problem's evaluation Quizzes, assignment
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
b1	Interpret the laboratory results of lipids carbohydrates and proteins and correlate them with other laboratory findings.	Problem solving , tutorial, group discussion, laboratory practical	Assignment, oral exam, MCQ and lab-report
b2	Transform the knowledge gained in biochemistry to practical application and understanding human diseases.	Case study, problem solving, brain storm	Assignment, case report, practical exam
b3	Select and assess the best laboratory investigation to verify and interpret the biochemical changes in health and in certain diseases.	Laboratory practices, brainstorm, case study	Laboratory report Case report, quiz
b4	Think critically and solve problems related to biochemical investigation.	Laboratory practices, problem solving	Practical exam, case report
(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	Apply scientific methods for safety while working in the lab.	Laboratory practice, laboratory demonstration, Biosafety work sheet	Laboratory report, practical exam, biosafety check-list
c2	Collect, transport and analyze biological samples efficiently.	Laboratory practice, laboratory demonstration	Laboratory report, practical exam.
c3	Perform biochemical tests using standard procedures ensuring producing reliable precise and accurate results.	Laboratory practice, laboratory demonstration	Laboratory report, practical exam
c4	Use manual and automated instrumentations and show awareness to their calibration and maintenance.	Laboratory practice, animation and videos learning. Field visit	Practical exam, laboratory report,
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
d1	Respect the ethical role of laboratory medicine and the role of organization.	Laboratory practice, tutorial, group discussion.	Lecture and Laboratory attendance,
d2	Acquire skills to use computer and communication technology to develop self-education and continuous long-life learning.	Assignment, presentation, electronic learning	Seminar, assignment
d3	Work independently or in a team as a member or leader.	Seminar, group discussion	Assignment report, presentation
d4	Communicate effectively with your teacher friends and other faculty staff.	Group discussion, presentation	Oral exam, seminar

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to bioenergetic and metabolism	Bioenergetic Types of Chemical reactions, Metabolism definition and characteristics, integration	2	4	a1, b1,b2,b3,b4

		of metabolic pathway			
2	Carbohydrates Metabolism	<p>Digestion and absorption of carbohydrates</p> <p>Metabolism of fructose, galactose and their metabolic disorders,</p> <p>Glycolysis, gluconeogenesis,</p> <p>Pentose phosphate pathway, glycogen biosynthesis and degradation.</p> <p>Krebs cycles.</p> <p>Integration and regulation of metabolic pathways of carbohydrates</p>	3	6	a2, a3,a4 , b1,b2,b3,b4,d2,d3
3	Protein metabolism	<p>Digestion absorption and transport of amino acids, fate of amino acids in the body</p> <p>General catabolic pathway of amino acids, transamination and their role in metabolism of amino acids,</p> <p>Deamination, transporting and metabolism of ammonia, urea cycle, disorders of ammonia metabolism, inborn error of amino acids metabolism</p>	3	6	a2, a3,a4 , b1,b2,b3,b4,d2,d3
	Midterm exam	exam	1	2	a2, a3,a4 , b1,b2,b3,b4,d2,d3
4	Metabolism of lipids	<p>Digestion absorption and transport of lipids,</p> <p>Metabolism of fate in adipose tissue, fatty acids oxidation, ketonbody metabolism, metabolism of</p>	3	6	a2, a3,a4 , b1,b2,b3,b4,d2,d3

		lipoproteins, cholesterol and triglyceride biosynthesis, disorders of lipid metabolism			
5	Metabolism of nucleic acids	Digestion of nucleic acids, metabolism of purine and pyrimidine, salvage pathway for purine and pyrimidine, uric acid and disorders of nucleotides metabolism	1	2	a2, a3,a4 , b1,b2,b3,b4,d2,d3
6	Hemoglobin and heme metabolism	Heme biosynthesis, heme catabolism, porphyrias. Bilirubin transport conjugation and excretion	2	4	a2, a3,a4 , b1,b2,b3,b4,d2,d3
	Final exam		1	2	a1,a2,a3,a4, b1,b,b3, b4, d2,d3
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	Estimation of serum glucose, oral glucose tolerance test	2	4	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3,d4
2	Estimation of plasma proteins	2	4	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3
3	Urea, creatinine and uric acids	2	4	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3
4	Midterm exam	1	2	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3
5	Estimation of lipids profiles	2	4	c1, c2,c3, c4, b2,b3,b4, d1,d2,d3
6	Determination of urine ph and electrolytes	2	4	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3,d4
7	Estimation of transaminases	2	4	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3,d4

8	Final exam	1	2	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3,d4
Number of Weeks /and Units Per Semester		14	28	

IV- Teaching strategies of the course:

Lectures, Group discussions and Tutorials

Lectures using data show, Group discussions and Tutorials, workshop, analyzing and problem-solving methods. Laboratory work, directed reading, independent study and discussion

V- Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Seminar	b2,, d2,d4	6	2
3	Presentation	b2, d2,d4	8	3

VI- Schedule of Assessment Tasks for Students During the Semester:

8	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Seminar	9, 11	2	2%	b2, d2,d4
	Presentation and assignment	5, 12	3	3%	b2, d2,d4,
1	oral		5	5%	b2,d2,d4
2	Midterm practical exam	6	10	10%	c1, c2,c3, c4 , b2,b3,b4, d1,d2,d3
3	Mid-Term Theoretical Exam	9	10	10%	a2, a3,a4 , b1,b2,b3,b4,d2,d3
4	Logbook(Practical report)		10	10 %	c1-c4, b3
5	Final Practical Exam	13	20	20 %	c1,c2,c4,b3,b4, d1,d3
6	Final theoretical exam	16	40	40%	a1-a4,b1, b2,b4

7	Total		100	100 %	a2, a3,a4 , b1,b2,b3,b4,d2,d3
---	-------	--	-----	-------	----------------------------------

VII- Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

- 1- D M Vasudevan, (2019),Text book of Biochemistry for Medical Student, 9th edition Jaypee Publishers, India
- 2- Satyanarayana U, (2019),Biochemistry,5th edition, Generic Publisher. India

2- Essential References.

- 1- Lieberman and Marks's,(2017) Marks' Basic Medical Biochemistry: A Clinical Approach, 5th edition USA, Wolters Kluwer Health.
- 2- Wilma D Silvia (2020), Competency Based Practical Biochemistry Textbook, 2nd edition, Paras Medical Publisher. India
- 3- David L. Nelson; Michael M. Cox, (2021), Lehninger Principles of Biochemistry, 8th edition.

3- Electronic Materials and Web Sites etc.

- 1-http://highered.mcgraw-hill.com/sites/0072495855/student_view0/
- 2.<http://www.worthington-biochem.com/index/manual.html>
- 3.https://blog.feedspot.com/biochemistry_blogs/
4. <http://www.csun.edu/~hcchm001/biosites.htm>
5. <http://www.gwu.edu/~mpb/glycolysis3d.htm>
6. https://blog.feedspot.com/biochemistry_blogs/

I. Course Policies:

١	Class Attendance: Absence from lectures and/or tutorials shall not exceed 25%. Students who exceed the 25% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college shall not be allowed to take the final examination and shall receive a mark of zero for the course.
-	
٢	Tardy: Students should be attending the classes, as it has required for the assessments if the student is 15 minutes late in attending to the class for more than two classes he will loss 50% of quizzes mark -
٣	Exam Attendance/Punctuality: All examination and their roles will be according to Students affairs regulations
٤	Assignments & Projects:Student, who is submitting the assignments or the projects on time, will be awarded good percentage in grading of participation.
٥	Cheating: All students must be an ideal behavior, respect each other, their teachers, and

	respect the roles of the colleague. In addition, students should follow safety roles while working in the lab. Those who has been caught in any cheating case will be punished according to the Students affairs regulations -
6	Plagiarism: Student will be punished depend upon gravity of the action and according to Students affairs regulations which might be ranged from rewriting the homework to suspension or dismissal
7	Other policies:Using mobile or another electronic device capable to store or transfer data in class during the lecture or the exam is forbidden. -

Fundamental medical microbiology

I. Course Identification and General Information:					
1	Course Title:	Fundamental medical microbiology			
2	Course Code & Number:	B1102251			
3	Credit hours: 3	C.H			Total
		Th.	Seminar	Pr.	
		2		2	3
4	Study level/ semester at which this course is offered:	Year 2 1 st semester			
5	Pre –requisite (if any):				
6	Co –requisite (if any):				
7	Program (s) in which the course is offered:	Bachelor of Laboratory			
8	Language of teaching the course:	English			
9	Location of teaching the course:	Thamar University – Faculty of Medical Sciences			
10	Prepared By:	Dr. Abdulrahman Al-Haifi			
11	Date of Approval	2021			

II. Course Description:

This course is designed to enable students to acquire understanding of fundamentals of Microbiology, compare and contrast different microbes and comprehend the means of transmission and spread by various microorganisms. The course describes the structure, classification and growth of the microorganisms of medical importance and demonstrates the physical and chemical methods used to control microorganisms. The natural factors in immunity and the types of immunity are also presented.

III. Course Objectives:

The overall aims of the course are:

1. TO classify and explain the morphology and growth of microbes.
2. TO explore mechanisms by which microorganisms cause disease.
3. TO develop understanding of how the human immune system counteracts infection by specific and non-specific mechanisms.
4. To identify the contribution of the microbiologist and the microbiology laboratory to the diagnosis of infection

IV. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- a1 Integrate knowledge to Microbiology and scope of Microorganisms on our daily life.
a2 Understand the basic microbial nutritional, physical and chemical requirements and the significance of controlling the microbial growth.
a3 Identify the microbial structure, understand their role in the pathogenicity and understand host pathogen interaction.

Knowledge and Understanding PILOs		Knowledge and Understanding CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
A2	Demonstrate understanding of the principles and procedures of Biochemical, Hematological, Immunological, Microbiological and Parasitological Sciences as well as Blood Banking in laboratory investigation.	a1	Integrate knowledge to Microbiology and scope of Microorganisms on our daily life.

A3	Define and describe the mechanisms of various metabolic processes in the physiological and pathological conditions.	a2	Understand the basic microbial nutritional, physical and chemical requirements and the significance of controlling the microbial growth
		a3	Identify the microbial structure, understand their role in the pathogenicity and understand host pathogen interaction

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- b1 Explain concepts and principles of microbiology and its importance in laboratory medicine.
- b2 Describe the different disease producing organisms.
- b3 Introduced to some essential antimicrobial agents and their mechanism of action and the development of antimicrobial resistance

Intellectual Skills PILOs		Intellectual Skills CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
B1	Integrate the concepts and principles of the basic and applied Medical Sciences to formulate and test hypothesis	b1	Explain concepts and principles of microbiology and its importance in laboratory medicine
B3	Use critical thinking and problem solving skills to make evidence-based decisions.	b2	Describe the different disease producing organisms.
		b3	Introduced to some essential antimicrobial agents and their mechanism of action and the development of antimicrobial resistance

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- c1 Able to differentiate between some basic and special microbial media for isolating and transporting the pathogen.
- c2 Use of Microscope to observe and differentiate between microorganisms.
- c3 Carry out of advanced practical skills, such as clinical specimens' collection of pathogenic microorganisms.

Professional and Practical Skills PILOs		Professional and Practical Skills CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
C2	Apply technical skills in using laboratory equipment, tools, and materials in laboratory practice.	c1	Able to differentiate between some basic and special microbial media for isolating and transporting the pathogen
C3	Collect, transport, preserve and store samples according to Standard Operating Procedures (SOPs).	c1	Able to differentiate between some basic and special microbial media for isolating and transporting the pathogen
		c3	Carry out of advanced practical skills, such as clinical specimens' collection of pathogenic microorganisms.
C4	Employ different methods in the diagnosis of various Biochemical, Hematological, Immunological, Microbiological, Parasitological and pathological diseases.	c2	use of Microscope to observe and differentiate between microorganisms
		c3	Carry out of advanced practical skills, such as clinical specimens' collection of pathogenic microorganisms

Transferable (General) Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes) After completing the course, the student will be able to: d1 Demonstrate ethical conduct with patients and health care workers. d2 Conduct research projects in the field of Laboratory medicine with society.			
Transferable (General) Skills PILOs		Transferable (General) Skills CILOs	
After completing this program, students would be able to:		After completing this course, students would be able to:	
D1	Participate in teamwork harmoniously and exhibit collaboration with colleagues and other health care professionals.	d1	Demonstrate ethical conduct with patients and health care workers.
D6	Conduct research projects in the field of Laboratory medicine with sense of social responsibility	d2	Conduct research projects in the field of Laboratory medicine with society.

V. Alignment Course Intended Learning Outcomes

(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	<ul style="list-style-type: none"> - Lectures - Discussion Sessions 	<ul style="list-style-type: none"> - Periodic exam (Quizzes) - Evaluate assignments - Mid & final exam
a2		
a3		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	<ul style="list-style-type: none"> - Discussion Sessions - Problem solving - Group discussion 	<ul style="list-style-type: none"> - Oral presentations - Evaluate assignments - Mid & final exam
b2		
b3		

(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	<ul style="list-style-type: none"> - Practical discussion 	<ul style="list-style-type: none"> - Oral presentations - Practical exams - LAB report
c2		
c3		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
d1	Demonstrate ethical conduct with patients and health care workers.	<ul style="list-style-type: none"> - Group discussion - Collecting information from the internet. 	<ul style="list-style-type: none"> - Oral presentations
d2	Conduct research projects in the field of Laboratory medicine with society		

V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction to microbiology	<ul style="list-style-type: none"> - Microbial taxonomy. - Principles of microbiology. 	1	2	a1, a2, a3, b1, b2
2	General characteristics of Microbes	<ul style="list-style-type: none"> - Structure and classification of Microbes - Morphological types, Size and form of bacteria - Motility and Colonization - Microbial growth and Basic Chemical and physical requirements. - Sterilization and disinfection (Control of Microbial growth). - Culture Media and staining. 	3	6	a1, a2, a3, b1, b2, c1
3	Culture media	<ul style="list-style-type: none"> - Culture and media Types and preparation. - Semi synthetic, synthetic, enriched, enrichment, selective and differential media. Pure culture techniques. - Tube dilution, pour, spread, streak plate. Anaerobic cultivation of bacteria. - Specimen collections and transportations Media 	2	4	a1, a2, b2, b3, c1, c2
4	Pathogenic organisms	<ul style="list-style-type: none"> - Characteristics, Source, portal of entry, transmission of infection, Identification of disease producing micro-organisms. - Microbial normal flora. - Pathogenic Micro-organisms - Cocci — gram positive and gram negative; Bacilli— gram positive and gram negative - Viruses - Fungi -Superficial and Deep mycoses - Parasites 	4	8	a1,a2, a3, b1,b2

	Immunity	<ul style="list-style-type: none"> - Immunity-Types, classification - Antigen and antibody reaction - Hypersensitivity reactions - Serological tests - Immunoglobulins – structure, types & properties - Vaccines -types & Classification, storage and handling, cold chain, Immunization for various diseases - Immunization Schedule 	2	4	A1,a2, b2
	Antimicrobial agents	<ul style="list-style-type: none"> - Importance of Antibiotic - Antimicrobial susceptibility testing, MIC, MBC. - Anti Microbial Resistance 	2	4	a3, b3,d1, d2
Number of Weeks /and Units Per Semester			14	28	

B – Case Studies and Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	- Safety rule in Microbiology laboratory and Instrumentations	2	4	a1, c1, c2
2	- Sterilizations and disinfectant	1	2	c2, c3
3	- Isolation of pure culture	1	2	a2, c3
4	- Simple staining, wet preparation and Microscopy	2	4	a1, c1, c2, c3
5	- Special stain (AFP) & Microscopy	1	2	a1, c1, c2, c3
6	- Specimen collections and transportations Media	2	4	a1, b2, c1, c2, c3
7	- Antimicrobial susceptibility testing, MIC, MBC	2	4	a3, b3, c1, c2, c3, d2
8	- Revision	1	2	a1, a3, c1, c2, c3, d1, d2
Number of Weeks /and Units Per Semester		12	24	

VI. Teaching strategies of the course:

- Lectures
- Discussion sessions
- LAB Class
- Media Presentations: Power Point, Video
- Assignments
- Solving of problems

VII. Assignments:

No	Assignments	Mark	Week Due	Aligned CILOs(symbols)
1	Participation	2.5	Weekly	
2	Quizzes	2.5	Weekly	
3	Research	2.5	6 th W	
4	Assignments	2.5	6 th W	
5	Mid – Exam (theoretical)	20	7 th W	
	Final Exam (practical)	30	15 th W	
	Total score	60%		

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 & Homework, Tasks & Presentation	Fortnightly	5	5%	a1; a2; a3; b1; b2;c1;c2; d2; d3
2	Quizzes	W6	2.5	2.5%	a1; a2; a3; b1; b2;c1; c3
3	Mid-Term exam	W8	20	20%	a1; a2; a3; b1; b2; c1; c3
4	Practical reports	W12	2.5	2.5%	a1; b3; c2; c3; d2; d3; d4
5	Final exam practical	W 15	30	30%	a1; a3; b1; b3;c1; c3; c4
6	Final Exam theory	W16	40	40%	a1; a2; a3; b1; b2;c1c3
Total			100	100%	

IX. Learning Resources:

- *Written in the following order: (Author - Year of publication - Title - Edition - Place of publication - Publisher).*

1- Required Textbook(s) (maximum two).

- 1) Barer, M. R., & Irving, W. L. (2018). Medical Microbiology E-Book: A Guide to Microbial Infections (19th Edition). Elsevier Health Sciences.
- 2) Tille, P. (2015). Bailey & Scott's diagnostic microbiology-E-Book (14th Edition). Elsevier Health Sciences.
- 3)

2- Essential References.

- 1) Practical Handbook of Microbiology; By Goldman E, 2015, 3rd edition.
- 2) Gracia, L. (2016). Diagnostic Medical Parasitology (6th Edition). Washington, D.C. : ASM Press,

3- Electronic Materials and Web Sites etc.

- <https://uqu.edu.sa/lib/917>

Course Specification Histology

I. Course Identification and General Information:						
1	Course Title:	Histology				
2	Course Code & Number:	B1102225				
3	Credit hours:	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2		1		3
4	Study level/ semester at which this course is offered:	2 nd Year 1 st semester				
5	Pre –requisite (if any):	General Biology				
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Laboratory Medicine				
8	Language of teaching the course:	English				
9	Location of teaching the course:					
10	Prepared By:	Dr. Abdulrahman Al-Haifi				
11	Date of Approval	2021				

II. Course Description:

--

III. Course Objectives:

--

Intellectual Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
After completing the course, the student will be able to:	
Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1	b1. Know various types of special stains for various organs
	b2. Know ultrastructure of different cells studied in various organs
	b3. Know how to label diagrams of different levels in the spinal cord & brain stem

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
After completing the course, the student will be able to:	
Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1	c1. Answer questions on various parts of the curriculum
	c2. Correlate between histological structure & function of different organs of all systems
	c3. Diagnose slides different from those seen during his course but of the same organs previously studied

Transferable (General) Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes) After completing the course, the student will be able to:	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1	d1. Communicate with teacher, ask questions, solve problems, and use computers

VI. Alignment Course Intended Learning Outcomes

(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 normal histological structure of various systems previously mentioned Respiratory , digestive , endocrine , urinary , male & female genital , eye & ear	<ul style="list-style-type: none"> - Lectures and Groups discussion. - Practical presentations - Self - learning 	<ul style="list-style-type: none"> - Quizzes, Written exam.
a2. Describe various levels of sections in the spinal cord & brain stem		
a3. Describe various pathways of descending pyramidal, extrapyramidal tracts and pathways of ascending sensory tracts		
a4. Describe various types of lemnisci, medial longitudinal bundle, both cerebrum and cerebellum with its various connections		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Know various types of special stains for various organs	<ul style="list-style-type: none"> - Discussions and Training - Field visits - Problem solving 	<ul style="list-style-type: none"> - Quizzes, Homework - Observation - Task's Evaluates
b2. Know ultrastructure of different cells studied in various organs		
b3 Know how to label diagrams of different levels in the spinal cord & brain stem		

IV. Course Intended Learning Outcomes (CILOs):

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes) After completing the course, the student will be able to:	
Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A1	<p>a1. Describe normal histological structure of various systems previously mentioned Respiratory , digestive , endocrine , urinary , male & female genital , eye & ear</p> <p>a2. Describe various levels of sections in the spinal cord & brain stem</p> <p>a3. Describe various pathways of descending pyramidal, extrapyramidal tracts and pathways of ascending sensory tracts</p> <p>a4. Describe various types of lemnisci, medial longitudinal bundle, both cerebrum and cerebellum with its various connections</p>

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Answer questions on various parts of the curriculum	<ul style="list-style-type: none"> - Discussions and - Training - Field visits - Problem solving 	<ul style="list-style-type: none"> - Quizzes, Homework - Observation - Task's Evaluates
c2. Correlate between histological structure & function of different organs of all systems		
c3. Diagnose slides different from those seen during his course but of the same organs previously studied		
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Communicate with teacher, ask questions, solve problems, and use computers	<ul style="list-style-type: none"> - Group discussions - Cooperative learning. - Self – learning - Inductive and deductive 	<ul style="list-style-type: none"> - Homework - Evaluates of Oral Presentation

VII. Course Content:.

A. Theoretical Aspect:

Order	Topic List	Sub Topics List	No of Week	contact hours	ILOS
1	Basic histology	<ul style="list-style-type: none"> • The epithelial tissue. • Characteristic Features of Epithelial Cells. • Specializations of the Apical Cell Surface. • Types of Epithelia • Transport across Epithelia. • Renewal of Epithelial Cells. 	3	6	a1,-a3, b1-b3,
2	The connective tissue	<ul style="list-style-type: none"> • Cells of Connective Tissue. • Fibers • Ground Substance. • Types of Connective Tissue. • Adipose Tissue. • Cartilage. • Bone. 	3	4	a1, a2, a4, b1,b2
3	The muscular tissues	<ul style="list-style-type: none"> • Smooth muscles. • Skeletal muscles. • Cardiac muscles. 	2	4	a1, a2, a6, b1, b3
5	The nervous tissues.	The nervous tissues.	1	2	a3, b1-b3
6	The blood	The blood	1	2	a1, a2, a4, b1-b3
7	Systemic histology:	1-The aorta, 2- spleen and lymph nodes, 3- trachea and lung. 4- Liver and pancreas 5- stomach fundus and small intestine 6- kidney, 7- testis, 8-ovary, 9-pituitary gland and thyroid gland, 10- spinal cord.	4	8	a1, a2, b1, b2, d1
Number of Weeks /and Units Per Semester			14	28	

B. Practical Aspect:				
Order	Topics List (Tasks/ Experiments)	No of Weeks	Contact Hours	ILOS
1	Introduction: Micro and macro anatomical cytological and histochemical sample.	1	2	c1-c3
2	Macroscopically examination.	1	2	c1
3	Decalcification: <ul style="list-style-type: none"> • Definition, techniques. • Decalcification solution. 	1	2	c1-c3
4	Tissue processing: <ul style="list-style-type: none"> • Manual methods: • Fixation. • Dehydration. • Clearing. • Impregnation. • Automatic methods. 	2	4	c1-3
5	Embedding, blocking out, and trimming.	1	2	c1-c3
6	Section cutting and microtome	1	2	c1, c2
7	Staining	2	4	c1, c2
8	Mounting	1	2	c2, c3
9	Cytological techniques.	2	4	c1-c3
Number of Weeks /and Units Per Semester		12	24	

VIII. Teaching strategies of the course:
<ul style="list-style-type: none"> ▪ Lectures ▪ Groups discussion. ▪ Discussions and Training ▪ Practical presentations ▪ Problem solving ▪ Practical in Lab ▪ Self – learning ▪ Inductive and deductive

IX. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Class attendance and participation	a1, a2,a3, a4, b1, b2, b3, c1, d1	weekly	2.5
2	Homework, presentation	a1, a2, b1, b2, c1, d1.	11	2.5

X. 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		1-14	5	5%	a1,b1,b2,c1, a2, d1
2	Quizzes 1		6	2.5	2.5%	a1-a4, b1,c1
3	Mid-semester exam of theoretical part (written exam)		8	10	10%	a1,a2,b1,c1, d1
	Quizzes 2		12	2.5	2.5%	a2, b1, b2, c1, d1
4	Lab. Term works	Attitude	1-11	5	5%	c1-c3, d1,d2
5		Accomplishments		5	5%	
6	Final exam (practical)		12	20	20%	c1-c3,d1,
7	Final exam of theoretical part (written exam)		16	50	50%	a1-a4,b-,b3,c1, d1
Total				100	100%	

XI. Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
	1. Gartner, L.P. and Hiatt, J.L. Color Text Books of Histology: Saunders Co., Baltimore, Latest Edition. 2. Wheater's Functional Histology. Churchill Livingstone, Latest Edition.
2- Essential References.	
3- Electronic Materials and Web Sites etc.	

Course Specification First Aid

I. Course Identification and General Information:						
1	Course Title:	First Aid				
2	Course Code & Number:	B1102232				
3	Credit hours:	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		1		1		2
4	Study level/ semester at which this course is offered:	Level2 Semester 1				
5	Pre –requisite (if any):					
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Laboratory Medicine				
8	Language of teaching the course:					
9	Location of teaching the course:					
10	Prepared By:					
11	Date of Approval					

II. Course Description:

This course covers the basic principles and objectives of first aid. In addition to how to first aid the patient from a number of emergency accidents Such as fractures, burns, hemorrhage, shock, suffocation and others. Using problem solving methods and creative thinking. This course aims to enable students to acquire the necessary knowledge to apply the principles of first aid.

And the use of problem-solving methods and creative thinking through lectures. Theory and use of educational models. Understand the roles and duties of a lifesaver. and assessment of physical damage (physical) resulting from accidents

III. Course Objectives:

This course aims to provide students with:

1. To enable the student to gain skills in emergency and blood collection.
2. Acquired knowledge of the basic first aid.
3. Understand the principles on which the first aid treatment base.

IV. Course Intended Learning Outcomes (CILOs):

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- a1-Principals of basic management, purpose, general rules, and limitations of first aids.
- a2- Principals of normal and abnormal bodily functions in healthy and diseased states.
- a3. Principals of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A1	a1

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- b1. Recognize the relationship between human body systems, safe and effective use of medicine.
- b2. Recognize Purpose, Limitations, General Rules And proper application of first-aid
- b3. Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1	b1

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- c1. Apply the principals and guidelines for the treatment of shock, bleeding, burns, and fractures; methods of resuscitation; and methods of moving injured persons.
- c2. Assess drug interaction, drug –food interaction and proper indication of drugs during first aid treatment

Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1	c1

Transferable (General) Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

After completing the course, the student will be able to:

- d1- Manage time effectively
- d2- Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.

Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1	d1

V. Alignment Course Intended Learning Outcomes

(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 -Principals of basic management, purpose, general rules, and limitations of first aids.	- Discussion Sessions	- Writing Exam
a2- Principals of normal and abnormal bodily functions in healthy and diseased states.	- Assignments that require collecting information from the internet	- Semester activities
a3. Principals of body anatomy and function to perform first aid measures and initial therapy for injured and		- Final Exam

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and

Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Recognize the relationship between human body systems, safe and effective use of medicine.	<ul style="list-style-type: none"> - lectures (L) - Small group discussion 	<ul style="list-style-type: none"> - Oral presentations - Evaluate assignments - Mid& final exam
b2. Recognize Purpose, Limitations, General Rules And proper application of first-aid		
b3. Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.		

(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. Apply the principals and guidelines for the treatment of shock, bleeding, burns, and fractures; methods of resuscitation; and methods of moving injured persons.	<ul style="list-style-type: none"> - Solving of some clinical cases. - Presentations - Practical course 	<ul style="list-style-type: none"> - Oral presentations - LAB report - Midterm exams - Practical exam - Semester activities
c2. Assess drug interaction, drug –food interaction and proper indication of drugs during first aid treatment		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Manage time effectively	<ul style="list-style-type: none"> - Discussion Sessions - Assignments that require collecting information from the internet 	<ul style="list-style-type: none"> - Oral presentations - Semester activities
d2- Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases		

V. Course Content:					
A. Theoretical Aspect:					
Order	Topics List	Sub-topics List	No of Weeks	Contact Hours	ILOS
1	Definition of first aids The aim of first aids	<ul style="list-style-type: none"> • Definition of first aids • The aim of first aids 	1	2	a1- a3, b1, b2
2	Hemorrhage and wounds.	<ul style="list-style-type: none"> • External bleeding. • Internal bleeding. 	1	2	a1-a3, b2, b3
3	Shock	<ul style="list-style-type: none"> • Definition, types. • First aid treatments 	1	2	a2, a3, b2, b3
4	Unconsciousness:	<ul style="list-style-type: none"> • Definition, • first aid and treatment 	1	2	a2, a3, b2, b2
5	Epileptic fits:	<ul style="list-style-type: none"> • Definition, • first aid and treatment 	1	2	a2, a3, b1, b2
6	Splits and bandage:	<ul style="list-style-type: none"> • Aims of bandage in first aid. • Aims of splinting in first aid. • Methods of apply bandages 	2	4	a2, a3, b2, b3, d1

7	Fracture and dislocation:	<ul style="list-style-type: none"> Definition, types, signs, and symptoms, the first aid and treatments. Definition of dislocation, the first aid treatments. 	1	2	a2, a3, b2, b3
8	Burns and scalds:	<ul style="list-style-type: none"> Heat burns and chemical scalds. First aid and treatments 	1	2	a2, a3, b2, b3, d1, d2
9	Management of laboratory accidents:	<ul style="list-style-type: none"> Infections, burns, cults, harmful fumes inhalation, chemical and explosions injuries, and electric shocks 	2	4	a2, a3, b2, b3, d1
10	Asphyxia and C.R.P.	<ul style="list-style-type: none"> Artificial respiration 	1	2	a1- a3, b2, b3, d1, d2
11	Poisoning and Vital signs	<ul style="list-style-type: none"> Poisoning Vital signs 	2	4	a2, a3, b2, b3, d2
Number of Weeks /and Units Per Semester			14	28	

B. Practical Aspect:

Order	Tasks/ Experiments	No of Weeks	Contact Hours	ILOS
1	Application of ABCs roles	2	4	c1, c2
2	Wounds and how to stop bleeding	2	4	c1, c2
3	Burns	1	2	c1, c2
4	Fractures	1	2	c1, c2
5	Shock and IV fluids	1	2	c1, c2
6	Preparation of antiseptics and disinfectants and their uses	1	2	c1, c2
7	Certain medications used in emergency such as analgesics, antibiotics	1	2	c1, c2
8	Different types if injections: iv bolus, infusion, push etc	1	2	c1, c2
9	Different types if injections: im, sc, id etc	2	4	c1, c2
Number of Weeks /and Units Per Semester		12	24	

VI. Teaching strategies of the course:

- Lectures
- Discussion sessions
- LAB Class
- Media Presentations: Power Point, Video
- Assignments
- Solving of problems

VII. Assignments:

No	Assignments	Mark	Week Due	Aligned CILOs(symbols)
1	Participation	2.5	Weekly	
2	Quizzes	2.5	Weekly	
3	Research	2.5	6 th W	
4	Assignments	2.5	6 th W	
5	Mid – Exam (theoretical)	10	7 th W	
	practical	20	15 th W	
	Total score	40%		

VIII. Schedule of Assessment for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments & Homework, Tasks & Presentation	Fortnightly	7.5	7.5%	a1; a2; a3; b1; b2;c1;c2; d2
2	Quizzes	W6	2.5	2.5%	a1; a2; a3; b1; b2;c1
3	Mid-Term exam	W8	10	10%	a1; a2; a3; b1; b2; c1
4	Practical reports and Med Pract. Exam	W12	10	10%	a1; b3; c2d2
5	Final exam practical	W 15	20	20%	a1; a3; b1; b3;c1;
6	Final Exam theory	W16	50	50%	a1; a2; a3; b1; b2;c1
Total			100	100%	

IX. Learning Resources:

- Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1. Bailey & Love. short practice of surgery Latest edition.
2. Terry, N. Current surgical diagnosis and treatment, Latest edition.
3. Browse, L; An introduction to symptoms and signs of surgical disease, Latest edition.

2- Essential References.

3- Electronic Materials and Web Sites etc.

Course Specification

I. Course Identification and General Information:						
١	Course Title:	Hematology I				
٢	Course Code & Number:	B1102261				
٣	Credit hours:	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2		2		3
٤	Study level/ semester at which this course is offered:	2 year: 2 semester				
٥	Pre –requisite (if any):	Biology ,Physiology ,Histology and Anatomy				
٦	Co –requisite (if any):	None				
٨	Program (s) in which the course is offered:	Bachelor of Laboratory Medicine				
٩	Language of teaching the course:	English				
١٠	Location of teaching the course:	Faculty of medicine and health sciences				
11	Prepared By:	Prof.Dr. Lutfi A.S. Al-Maktari				
12	Date of Approval					

II. Course Description:

The course is designed so as to introduce students to the basic concepts of the hematopoietic system, and its association to other organ systems, erythropoiesis, thrombopoiesis, and leucopoiesis in health and illness, This course provides an introduction and practical experience on Phlebotomy: locating and assessing skin puncture, arterial draws, venipuncture sites, and capillary puncture methods for adults and children, and infants from patients in medical settings. It focuses on their collection conditions and preservatives and includes routine hematology procedures and tests of red cells, hemoglobin, platelets, and white cells, blood film preparation and staining, and normal morphology of blood cells on blood film.

III. Course Objectives:

1. Define concepts in hematology and describe the origin, sites, development and differentiation of various cellular elements of the blood.
2. Outline different hematopoietic tissues prenatally and postnatally and describe different cell lineages during hematopoiesis.
3. Explain the regulatory mechanisms and metabolic pathways of hematopoiesis and outline the disorders related to abnormal hematopoiesis.
4. Analyze and evaluate evidence-based basic information needed in Hematological Laboratory Medicine practice.
5. Differentiate between the different types of immature and mature blood cells and link them to hematological disorders.
6. Apply rules and guidelines related to safety precautions in the laboratory to perform experiments in a risk free environment.
7. Collect capillary and venous blood under aseptic conditions and properly prepare and use anticoagulants, stains and other reagents used in the hematology laboratory.
8. Perform basic techniques to estimate hemoglobin level ,and Prepare, fix, stain and examine blood smears for count different blood cells by identify different types of immature cells under light microscope.
9. Work independently or as a team member and effectively communicate with the teaching staff and colleagues to identify, analyze, solve encountered problems, be able to undertake self-learning and understand emerging issues.

IV. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A2. Demonstrate understanding of the principles and procedures of Biochemical, Hematological, Immunological, Microbiological and Parasitological Sciences as well as Blood Banking in laboratory investigation.	a1. Define concepts in hematology and describe the origin, sites, development and differentiation of various cellular elements of the blood.
A4. Identify different biological sample collections, processing, storage and transportation.	a2. Outline different hematopoietic tissues prenatally and postnatally and describe different cell lineages during hematopoiesis.
A6. Integrate knowledge of various key disciplines and current Laboratory methods available to further their understanding of the study, investigation, diagnosis and monitoring of human health and disease in clinical and research environments.	a3. Explain the regulatory mechanisms and metabolic pathways of hematopoiesis and outline the disorders related to abnormal hematopoiesis.

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1. Integrate the concepts and principles of the basic and applied Medical Sciences to formulate and test hypothesis.	b1. Differentiate between the different types of immature and mature blood cells and link them to hematological disorders.
B4. Analyze and evaluate evidence-based information needed in Laboratory Medicine practice.	b1. Analyze and evaluate evidence-based basic information needed in Hematological Laboratory Medicine practice .

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1. Execute quality management system and biosafety procedures in laboratory practice.	c1. Apply rules and guidelines related to safety precautions in the laboratory to perform experiments in a risk free environment.
C3. Collect, transport, preserve and store samples according to Standard Operating Procedures (SOPs) C2- Apply technical skills in using laboratory equipment, tools, and materials in laboratory practice.	c2. Collect capillary and venous blood under aseptic conditions and properly prepare and use anticoagulants, stains and other reagents used in the hematology laboratory.
C4. Employ different methods in the diagnosis of various Biochemical, Hematological, Immunological, Microbiological, Parasitological and pathological diseases.	c3. Perform basic techniques to estimate hemoglobin level and prepare, fix, stain and examine blood smears for count different blood cells by identify different types of immature cells under light microscope.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1 Communicate ideas and write planning strategies in Laboratory Management and quality assurance.	d1. Work independently or as a team member and effectively communicate with the teaching staff and colleagues to identify, analyze, solve encountered problems, be able to undertake self-learning and understand emerging issues.

V. Alignment Course Intended Learning Outcomes

(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. Explain terminology related to laboratory quality assurance and management and state the purposes of internal quality control and external quality assessment.	<ul style="list-style-type: none"> - Interactive Lectures - Self-learning - Brain storming 	<ul style="list-style-type: none"> -Written exam -Reports evaluation -Problems evaluation - MCQ -Quizzes
a2. Recognize the types, sources and consequences of laboratory errors as well as different measures of uncertainty.		
a3. State the purpose and elements of quality audit and accreditation and describe the levels and procedures of laboratory management.		
a4. Recognize different approaches of quality assurance related to sampling, analysis and reporting of laboratory results in different laboratory disciplines.		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Integrate the concepts of quality control and assurance within different phases of laboratory analysis in different medical laboratory disciplines.	<ul style="list-style-type: none"> - Interactive Lectures - Discussion - Self-learning - Brain storming 	<ul style="list-style-type: none"> - Quizzes -Midterm Exam -Final Exam - Class and Laboratory attendance - Oral exams - Coursework assignments
b2. Analyze laboratory errors and follow a systematic approach to solve them within the context of quality assurance and total quality management.		

(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. Apply the concepts and processes that underpin quality control and assurance to the quality of tested specimens, reagents, stains and equipment in the medical laboratory.	<ul style="list-style-type: none"> - Laboratory demonstrations - Laboratory practice - Group discussion - Animations and videos - Lab. Visits 	<ul style="list-style-type: none"> - Practical quizzes - Portfolios - Logbooks and reports - -Mid-semester and final exams
C2. Perform routine calibration of instruments used in the laboratory and prepare and follow SOPs for laboratory tests.		
C3. Apply methods for quality assurance including monitoring and evaluating the quality of testing procedures.		
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Participate in teamwork harmoniously and exhibit collaboration with colleagues and other health care professionals.	<ul style="list-style-type: none"> - Discussion - Self-Learning - Presentation - Interactive Lectures - Seminars 	<ul style="list-style-type: none"> -Research -Discussion. - Group work

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	<ul style="list-style-type: none"> - General definitions of hematology - Course contents 	1	2	a1, a2, d1
2	Blood	Definition, physical properties, volume, components and function of blood	1	2	a1, a2, b1, d1,
3	Hemopoiesis	<ul style="list-style-type: none"> - Definition, organs, functions, tissue and sites of hemopoiesis - Hemopoietic stem and progenitor cells - - BM structure and stroma - Hemopoiesis and hemopoietic growth factors - Cell cycle and apoptosis - Characteristic features of normal cell maturation 	2	4	a1, a2, b1, b2,d1
4	Erythrocytes	- Function, morphology of erythrocyte.	1	2	a1, a2,

		<ul style="list-style-type: none"> - Origin, development series, regulation and requirements of erythropoiesis - Kinetics and fate of erythrocyte 			b1, d1
5	Red cell membrane	<ul style="list-style-type: none"> - Red cell membrane: structure and function 	1	2	a1, a2, b1, d1
6	Red cell metabolism	<ul style="list-style-type: none"> - Red cell metabolism: anaerobic glycolysis (Embden- Meyerhof pathway and pentose phosphate shunt) 	1	2	a1, a2, b1, d1
7	Mid-Term Theoretical exam	-	1	2	a1, a2,a3, b1, d1
8	Hemoglobin (Hb)	<ul style="list-style-type: none"> - Function, structure, synthesis, types and breakdown of Hb - Abnormal Hb pigments 	1	2	a1, a2, b1, d1
9	Leucocytes	<ul style="list-style-type: none"> - Types and functions and of leucocytes - Origin and leucopoiesis. - Normal total and differential WBC count. - Morphology of mature leucocytes in blood 	1	2	a1, a2,a3 b1,b2, d1
10	Granulocytes	<ul style="list-style-type: none"> - Types, morphology and function of neutrophil, esoinophil and basophil. - Oorigin, development series,d regulation of granulopoiesis - Kinetics of neutrophil, esoinophil and basophil. 	1	2	a1, a2, b1, d1
11	Monocytes	<ul style="list-style-type: none"> - Morphology and function. - Origin, development series and kinetics of monocytes. - Reticuloendothelial system 	1	2	a1, a2, a3,b1, d1
12	Lymphocytes	<ul style="list-style-type: none"> - Morphology, types and function. - Origin, development series and kinetics of lymphocytes 	1	2	a1, a2, b1, d1
13	Thrombocytes I	<ul style="list-style-type: none"> - Function, morphology and ultrastructure of platelet 	1	2	a1, a2,a3 b1, d1
14	Thrombocytes II	<ul style="list-style-type: none"> - Origin, development series of thrombopoiesis - Regulation of thrombopoiesis - Kinetics and distribution of platelets. - Role of platelets in hemostasis 	1	2	a1, a2,a3 b1, d1
15	Final Theoretical Exam	-	1	2	a1, a2,a3 b1, d1
Number of Weeks /and Units Per Semester			16	32	

B. Case Studies and Practical Aspect:				
No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Biosafety procedures in laboratory practice	1	2	c1
	Venous and capillary blood collection	1	2	b2, c1, c2, d1
2	Anticoagulants preparation, use, mode of action	1	2	b2, c1, c2, d1
3	Blood separation, plasma and serum preparation	1	2	b2, c1, c2, d1
4	Hemoglobin (Hb) estimation	1	2	b2, c1, c2, d1
5	Packed cell volume (PCV) estimation	1	2	b2, c1, c2, d1
6	RBC count	1	2	b2, c1, c2, d1
	Red cells indices calculation	1	2	b2, c1, c2, d1
7	Leucocyte (WBC) count	1	2	b2, c1, c2, d1
8	Platelet count	1	2	b2, c1, c2, d1
9	Blood smear preparation and staining	1	2	b2, c1, c2, d1
10	Blood film study for blood cell distribution	1	2	b2, c1, c2, d1
11	Blood film study for RBC morphology	1	2	b2, c1, c2, d1
12	Blood film study for WBC morphology	1	2	b2, c1, c2, d1
13	Blood film study for platelet morphology	1	2	b2, c1, c2, d1
14	ESR	1	2	b2, c1, c2, d1
15	Final exam	1	2	b2, c1, c2, d1
Number of Weeks /and Units Per Semester		15	30	

V. Teaching strategies of the course:	
<ul style="list-style-type: none"> - Interactive Lectures - Discussion - Self Learning - Presentation - Seminars - Brain storming - Laboratory demonstrations - Laboratory practice - Group discussion - Animations and videos - Lab. Visits 	

VI. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment : Searching information about related subjects of hematology I	d1	10	5

VII. 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	6 th	5	5 %	a1,a2, a3 b1,b2
2	Assignments & Homework, Tasks & Presentation	10 th	5	5 %	d1
3	Mid-Term exam	8 th	10	10 %	a1,a2, a3 b1, d2
4	Practical reports	weekly	10	10%	c1-c3
5	Final exam practical	15 th	30	30%	c1-c3
6	Final Exam theory	16 th	40	40 %	a1,a2, a3 b1, b2,d2
Total			100	100%	

VIII. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

- 1- Hoffbrand AV, Moss PAH. 2020, Essential Haematology. 6thed, Chichester: Wiley-Blackwel.,
- 2-Shirlyn B. McKenzie AND J. Lynne Williams(2018) . Clinical laboratory Hematology ,second edition,Elizabeth Zeibig Series Editor.

2- Essential References.

- 1- John P. Greer, Daniel A. Arber, Bertil Glader, Alan F. List, Robert T. Means, Jr., Frixos Paraskevas, George M. Rodgers, and John, 2018: Wintrob's Clinical Hematology. 14 edn. Lippincott Williams & Wilkins, New York
- 2- Bain, B.J, Bates. I, Laffan, A.L. 2017, Dacie and Lewis Practical Haematology ,17th ed, Elsevier Health Science. Churchill Livingstone, Edinburgh,
- 3- Ronald Hoffman, Edward J. Benz Jr. Sanford J. Shattil: Hoffman:2017, Hematology: Basic principles and practice, 7 ed. Churchill Livingstone New York.

3- Electronic Materials and Web Sites etc.

- 1-www.hematology.org
- 2.www.haem.net
3. www.hematologylibrary.org
- 4- Atlas of Hematology (<http://www.hematologyatlas.com>)

X: Course Policies:

١	Class Attendance: Absence from lectures and/or tutorials shall not exceed 25%. Students who exceed the 25% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college shall not be allowed to take the final examination and shall receive a mark of zero for the course. -
٢	Tardy: Students should be attending the classes, as it has required for the assessments if the student is 15 minutes late in attending to the class for more than two classes he will loss 50% of quizzes mark -
٣	Exam Attendance/Punctuality: All examination and their roles will be according to Students affairs regulations -
٤	Assignments & Projects: Student, who is submitting the assignments or the projects on time, will be awarded good percentage in grading of participation.
٥	Cheating: All students must be an ideal behavior, respect each other, their teachers, and respect the roles of the colleague. In addition, students should follow safety roles while working in the lab. Those who has been caught in any cheating case will be punished according to the Students affairs regulations -
6	Plagiarism: Student will be punished depend upon gravity of the action and according to Students affairs regulations which might be ranged from rewriting the homework to suspension or dismissal
7	Other policies: Using mobile or another electronic device capable to store or transfer data in class during the lecture or the exam is forbidden. -

Course Specification

Faculty : Faculty of Medical Sciences					
Program : Laboratory Medicine					
I. Course Identification and General Information:					
١	Course Title:	Immunology			
٢	Course Code & Number:	B1102252			
٣	Credit hours:	C.H			
		Th.	Seminar	Pr	Tr.
		2		2	
TOTAL					
3					
٤	Study level/ semester at which this course is offered:	Level 2, second semester			
٥	Pre –requisite (if any):	B1102251			
٦	Co –requisite (if any):				
٨	Program (s) in which the course is offered:	Laboratory medicine			
٩	Language of teaching the course:	English			
١٠	Location of teaching the course:	Thamar university			
11	Prepared By:	Dr. Mohammed Almorish			
12	Date of Approval				

II. Course Description:

The aim of this course is designed to provide students the basic concepts of immunity and structure of the immune system and their function. Topics covered include description of the immune system, fundamentals of the immune response, characteristics and concepts of innate and adaptive immunity in body defense against threats. A practical training with popular routine immunological application for the diagnosis and monitoring of some diseases; and the use of immunological techniques as analytical tools in the clinical laboratory. The course consists of interactive lectures that incorporate presentations and animations to extend the explanation of specific ideas clearly.

III		Intended learning outcomes (ILOs)
Course Intended Learning Outcomes (ILOS)		Program ILOS
a. Knowledge and understanding Skills After completion of this course, the student should be able to:		A- Knowledge and understanding Skills
a1	Outline the key components of the innate and adaptive immune responses	A1
a2	Describe which cell types and organs are involved in an immune response.	A1, A2
a3	Identify the basis structure of the cellular molecules and their interactions during	A7,a1

	an immune response.	
a4	Describe complement, antigens , antibodies and T & B cell receptors	A1,A7
b. Intellectual Skills After completion of this course, the student should be able to:		B. Intellectual Skills
b1	Distinguish between non-specific (innate) and specific (adaptive) immune systems	B1
b2	Comprehend the mechanism of action of the humoral and cellular components of specific immunity	B1
b3	Differentiate the antibodies properties	B3
c. Professional and Practical Skills After completion of this course, the student should be able to:		C. Professional and Practical Skills
c1	Identify the different methods of Ag-Ab reactions.	C4
c2	Apply some routine immunological tests in the lab.	C4

d. Transferable Skills After completion of this course, the student should be able to:		D. Transferable Skills
d1	Communicate with instructors and students positively.	D2
d2	Write a full scientific report in the field of immunology.	D2,D6

I.	II. Intended learning outcomes (ILOs) of the course: After completion of this course, the student should be able to:	
	(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:	
	Course Intended Learning Outcomes	Teaching strategies
a1	Outline the key components of the innate and adaptive immune responses	Lectures presentations, animations
a2	Describe which cell types and organs are involved in an immune response.	
a3	Identify the basis structure of the cellular molecules and their interactions during an immune response.	
a4	Describe complement, antigens, antibodies	
		Assessment Strategies
		-Exams (MCQs, Oral, Written) -Assignments

	and T & B cell receptors		
(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 non-specific (innate) and specific (adaptive) immune systems	Lectures presentations, animations	Exams (MCQs, Oral, Written) Reports Assignments
b2	Comprehend the mechanism of action of the humoral and cellular components of non-specific immunity		
b3	Differentiate the antibodies properties		
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	Identify the different methods of Ag-Ab reactions.	-Presentations -Practical applications -Demonstrations -Group visits	Practical exam Tutorial Exercises Lab. reports
c2	Apply some routine immunological tests in the lab.		
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
d1	Communicate with instructors and students positively	- Lectures -Lab. Visits. - Self-learning - Problem Solving	Written Exam and MCQs -Reports. -Tutorial Exercises
d2	Write a full scientific report in the field of immunology.		

III. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List Learning Outcomes	Learning Outcomes	Number of Weeks	contact hours
1	Introduction and overview of the immune system	History and development of Immunology	a1 & b1	1	2
2	Anatomy of the Immune system.	<ul style="list-style-type: none"> ▪ Primary (Central) Organs or Tissues ▪ Secondary Primary (peripheral) Organs or Tissues. ▪ Mucosa-Associated Lymphoid Tissue (MALT) 	a1,a2	1	2

3	Circulation of lymph and fate of antigen following penetration. - Hematopoiesis.	-Stem cell ▪ Bone Marrow Stroma ▪ Development of immune cells and hematopoietic growth factors	a1,a2, d1	1	2
4	Immunity	▪ Definitions. ▪ Various types of Immunity. Mechanisms of Innate Immunity (First line of immune defense)	a3,b2, d2	1	2
5	Innate immunity	▪ Second line of immune defense Cells of the innate immunity and their functions	a2,a3,b2	1	2
6	Phagocytic cells & Phagocytosis	▪ Innate recognition receptors. ▪ Phagocytosis ○ Response ○ Initiation ○ killing	a2,a3,b2	1	2
7	Other Cells of the innate immunity	▪ Natural killer cells (NK), LAK cells and their killing mechanisms. ▪ Soluble (Humoral) factors.	a2,a3,b2	2	4
8	Mid Exam		a2,a3,b2, d1,d2	1	2
9	Complement System & Inflammation	▪ Complement system : Mechanisms and regulation ▪ Inflammation and acute phase proteins	a3,a4,b1,b2	1	2
10	Adaptive Immunity	▪ Antigens ▪ Subset of adaptive cells ▪ MHC I &II	a3,a4,b2,b3	1	2
11	T Cell immune response (cells and receptors)	▪ Antigen presentation to T lymphocytes. ▪ T cell receptor – CD3 complex. ▪ Cytokines	a3,a4,b1,b2	1	2

12	T cell maturation and activation	<ul style="list-style-type: none"> T Lymphocyte development, activation and differentiation. <p>The properties and effector mechanisms of cell Mediated immunity</p>	a3,a4,b1,b2	1	2
13	B cell immune response	<ul style="list-style-type: none"> B cells development, activation and differentiation. and antibody production. 	a3,a4,b2,b3	1	2
14	B cell immune response	The properties of Abs. and effector mechanisms of humoral (antibodies) immunity	a3,a4,b2,b3	1	2
15	Final exam		a3-a4,b1,b2,d1,d2	1	2
Number of Weeks /and Units Per Semester					
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	Overview of serological tests (Ag-ab reactions) and quality control	1	2	c1,c2,d1,d2
2	Agglutination tests <ul style="list-style-type: none"> Direct agglutination ✓ Slide agglutination (ABO blood grouping or identification of unknown bacterial cultures) ✓ Tube agglutination.(Widal test) 	1	2	
3	Agglutination tests <ul style="list-style-type: none"> Direct agglutination ✓ Tube agglutination.(brucellosis) ✓ Antiglobulin (Coomb's) test. 	1	2	
4	Agglutination tests <ul style="list-style-type: none"> Latex Agglutination Test ✓ Antistreptolysin-O (ASO) ✓ C reactive protein (CRP) 	1	2	
5	Agglutination tests <ul style="list-style-type: none"> Latex Agglutination Test ✓ RA factor ✓ Pregnancy test : Human chorionic gonadotropin (hCG) 	1	2	
6	<ul style="list-style-type: none"> Passive (indirect) agglutination ✓ Hemagglutination test (Rose-Waaler Test) Precipitation reactions	1	2	

	<ul style="list-style-type: none"> ▪ Ring test <ul style="list-style-type: none"> ✓ C-reactive protein (CRP) test ✓ Streptococcal grouping 		
7	Mid exam	1	2
8	Flocculation tests <ul style="list-style-type: none"> ✓ VDRL Test ✓ Rapid plasma reagin (RPR) 	1	2
9	Rapid diagnostic tests (RDTs) <ul style="list-style-type: none"> ✓ Rapid Diagnostic Test for Malaria ✓ Rapid diagnostic test for viral infections 	1	2
10	Enzyme-linked immunosorbant assay (ELISA) <ul style="list-style-type: none"> ✓ Principles ✓ Types 	1	2
11	Enzyme-linked immunosorbant assay (ELISA) <ul style="list-style-type: none"> ✓ Estimations ✓ Applications 	1	2
12	Immunofluorescence	1	2
13	Immunonephelometry - Immunoturbidimetry	1	2
14	Flow cytometry	1	2
15	Final exam	1	2
Number of Weeks /and Units Per Semester		15	30

IV. Assignments:

No	Assignments	Aligned CILOS(symbols)	Week Due	Mark
1	Tutorial exercise	C1,c2,d1,d2	W6, 11,14	5
2	Visit reports	C1,c2,d1,d2		5

I. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Tutorial exercise	5,10	5	5%	b1,2-c1,2
2	Visits	5,10	5	5%	d, d2,b4
3	Oral	15 week	5	5%	d1,d2
4	Midterm practical exam	6 th week	10	10%	c1-c4,
5	Mid-Term Theoretical Exam	7 th eek	10	10%	a1-a5 ,b1-b4,d1
6	Logbook(Practical report)	16 week	5	5%	c1-c2,d1
7	Final Practical Exam	15 week	20	20%	b3,b4, c1,c2,c3,c4,d1,d2
8	Final theoretical exam	16week	40	40%	a1-a5 ,b1-b4,d1
			100	100%	

II. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

- 1- Abul K. Abbas (2019) - Basic Immunology Functions and Disorders of the Immune System, 6th ed. Elsevier, USA.
- 2- Richard Coico, Geoffrey Sunshine (2021). Immunology: A Short Course, 8th ed. Wiley nBlackwell. US

2- Essential References.

- 1- Turgeon, Mary Louise.(2017). Immunology & Serology in Laboratory Medicine. 6th ed., Elsevier, USA.
- 2- (Usmle Prep) Kaplan-USMLE Step 1 Lecture Notes, 2016. Immunology and Microbiology- Kaplan Publishing .

3- Electronic Materials and Web Sites etc.

- 1-<http://www.microbiologybook.org/book/immunol-sta.htm>
- 3- <http://www.biology.arizona.edu/immunology/immunology.html>
- 4- [http:// www.handwrittentutorials.com/videos.php?id=32](http://www.handwrittentutorials.com/videos.php?id=32)

I. Course Policies:

١	Class Attendance: Absence from lectures and/or tutorials shall not exceed 25%. Students who exceed the 25% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college shall not be allowed to take the final examination and shall receive a mark of zero for the course.
٢	Tardy: Students should be attending the classes, as it has required for the assessments if the student is 15 minutes late in attending to the class for more than two classes he will loss 50% of quizzes mark -
٣	Exam Attendance/Punctuality: All examination and their roles will be according to Students affairs regulations
٤	Assignments & Projects: Student, who is submitting the assignments or the projects on time, will be awarded good percentage in grading of participation.
٥	Cheating: All students must be an ideal behavior, respect each other, their teachers, and respect the roles of the colleague. In addition, students should follow safety roles while working in the lab. Those who has been caught in any cheating case will be punished according to the Students affairs regulations
6	Plagiarism: Student will be punished depend upon gravity of the action and according to Students affairs regulations which might be ranged from rewriting the homework to suspension or dismissal
7	Other policies: Using mobile or another electronic device capable to store or transfer data in class during the lecture or the exam is forbidden.

General pathology Course Specification

Faculty: Faculty of Medical Sciences					
Program :Bachelor of Laboratory Medicine					
I. Course Identification and General Information:					
١	Course Title:	General pathology			
٢	Course Code & Number:	B1102271			
٣	Credit hours: 3	C.H			
		Th.	Seminar	Pr	Tr.
		2		2	
TOTAL					
3					
٤	Study level/ semester at which this course is offered:	Second year, second semester			
٥	Pre –requisite (if any):	B1102251			
٦	Co –requisite (if any):				
٨	Program (s) in which the course is offered:	Bachelor of Laboratory Medicine			
٩	Language of teaching the course:	English			
١٠	Location of teaching the course:	Thamar University			
11	Prepared By:	Dr: Walid Aldahibi			
12	Date of Approval				

II. Course Description:

The curriculum of general pathology aims at preparing the students in basic understanding of diseases and their pathogenesis. Introduction to pathology, basic definitions and familiarization with the common terms used in pathology, causes and mechanisms of cell injury, reversible and irreversible injury, systemic pathology, introduction of hyperplasia, hypoplasia, hypertrophy, atrophy, metaplasia, necrosis and apoptosis and microscopic features of pathological matters.

III. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs		Knowledge and Understanding CILOs
After completing this program, students would be able to:		After completing this course, students would be able to:
A1	a1	Demonstrate knowledge and understanding of the pathological terminologies, the concept of cell injury, the change produces thereby, in the different tissues and organs and the body capacity for healing.
A6	a2	Explain the etiopathogenesis, the pathological effects, and the clinicopathological correlation of common infectious and non-infectious diseases.
A2,A4	a3	Demonstrate knowledge and understanding of the concept of neoplasia with respect to etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body.

Intellectual Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1	b1 Select the necessary techniques for sample reception & processing according to the nature of specimen received.
B4	b2 Correlate normal and altered morphology (gross and microscopy) of different organ systems in different diseases to the extent needed of understanding of the disease processes and their clinical significance
B1	b3 Integrate the normal homeostatic mechanism, to recognize the derangements of these mechanism and the effect on human system.

Professional and Practical Skills	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C3	c1 Perform laboratory procedure to investigate and report the basic pathologic picture of a disorder based on gross or microscopic morphology.
C4	c2 Use proper procedure for collection, handling, storage and dispatch of clinical samples from patients, in a proper manner.

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D2, D5	d1 Communicate effectively and display ethical conduct during classes and in interactions with instructors, other students and patients.
D4,D6	d2 Evaluate research and published studies to remain informed of new techniques and procedures.

IV.	Alignment Course Intended Learning Outcomes to Teaching Strategies and Assessment Strategies		
	(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	Demonstrate knowledge and understanding of the pathological terminologies, the concept of cell injury, the change produces thereby, in the different tissues and organs and the body capacity for healing.	-Interactive Lectures -Self-learning -Brain storming, problem solving	Quiz, written exam, homework,
a2	Explain the etiopathogenesis, the pathological effects, and the clinicopathological correlation of common infectious and non-infectious diseases.	PowerPoint, presentations, Tutorial	Written exam, Quiz, assignment

a3	Demonstrate knowledge and understanding of the concept of neoplasia with respect to etiology, gross and microscopic features, diagnosis and prognosis in different tissues and organs of the body.	lecture, group discussion, electronic learning, laboratory session, tutorial seminar	Written exam, laboratory performance, assignment.
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
b1	Select the necessary techniques for sample reception & processing according to the nature of specimen received.	Lecture, tutorial, laboratory session, Brainstorm	Written exam lab report, quiz
b2	Correlate normal and altered morphology (gross and microscopy) of different organs/systems in different diseases to the extent needed of understanding of the disease processes and their clinical significance	Tutorial, laboratory session. Problem solving	Assignment , oral examination, lab report, practical exam
b3	Integrate the normal homeostatic mechanism, to recognize the derangements of these mechanism and the effect on human system.	Lecture, Laboratory session, , problem based study	Written exam, practical exam, assignment .
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	Perform laboratory procedure to investigate and report the basic pathologic picture of a disorder based on gross or microscopic morphology.	Laboratory practice, laboratory performance Video show	practical exam, homework assessment
c2	Use proper procedure for collection, handling, storage and dispatch of clinical samples from patients, in a proper manner.	Laboratory practice, laboratory demonstration,	Laboratory report, 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	Communicate effectively and display ethical conduct during classes and in interactions with instructors, other students and patients,	Group Discussion, laboratory performance presentation. Seminar	Oral presentation, oral exam, seminar, laboratory performance assessment
d2	Evaluate research and published studies to remain informed of new techniques and procedures.	Electronic learning, workshop participation, assignment	assignment, workshop report, research report.

V-Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Learning Outcomes	Number of Weeks	contact hours
1	Cellular response to injury:	Stress and adaptation Cell injury. Necrosis & apoptosis.	a1-a3,b2,b3	1	2

		Pathologic calcification, deposition & pigmentation. Cellular aging.			
2	Acute inflammation:	Definition, signs, components & mechanism Chemical mediators of inflammation. Outcomes, morphological types. Systemic and local effect of inflammation. Defects in leukocyte function.	a1,a2, b1-b3, d1	1	2
3	Chronic inflammation:	Chronic inflammation: Definition, causes, mechanism & morphology. Granulomatous inflammation. Morphologic patterns in inflammation. Role of lymphatic in inflammation.	a1,a2, b1-b3, d1, d2	1	2
4	Cell Regeneration	Cell Regeneration, healing & repair. Scar & keloid Stem cell concept in disease and therapy	a1,a2, b1-b3, d1, d2	1	2
5	Homodynamic disturbances	Edema Hyperemia & congestion.	a1,a3,b2,3,d2,d2	1	2
6	Hemostasis & coagulation	Components of hemostasis. Thrombosis. Embolization. Ischemia and Infarction	a1, a3	1	2
7	Midterm exam	Exam	a1-a3, b1-b3, d1, d2	1	2
8	Neoplasia	Neoplasia Neoplasia: Definition, incidence, terminology & classification. Characteristics of benign & malignant tumors. Dysplasia & carcinoma in situ. Epidemiology of cancer, role of heredity. Premalignant conditions. Molecular basis of cancer (oncogenes & tumor suppressor genes). Biology tumor growth. Etiology of cancer, (Chemical, radiation & viral oncogenesis). Clinical effects of tumors, cachexia & paraneoplastic conditions. Grading & staging of tumors.	a1-a3,b1, b2,3,d2,d2	2	4

		Laboratory diagnosis of tumors.			
9	Medical genetics	:Introduction & principles. Mendelian disorders: types & characteristics. Cytogenetic disorders. Multifactorial disorders. Investigations& diagnosis of genetic disorders	a1,a2,b1-b3, d1,d2	1	2
10	Immunological disorders:	Definition , cells , types , immune response , HLA and cytokines Immunodeficiency Hypersensitivity reactions Tolerance Autoimmunity Immunity to infections Vaccines Transplantation immunology Tumour immunology Miscellaneous e.g. immunodiagnosis, immunotherapy, immunomodulation	a1,a2,b1-b3, d1,d2	2	4
11	Pathology of infectious disease	Pathology of infectious disease	a2- b1-b3, d1,d2	1	2
12	Pathophysiology of systemic disease	<ul style="list-style-type: none"> • Renal diseases • Endocrine diseases • Musculoskeletal diseases Gastrointestinal , liver , pancreas diseases	a1-a3,b1-b3,d1,d2,	2	4
13	Final exam		a1-a3,b1-b3,d1,d2,	1	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	The Cell as a Unit of Health and Disease	1	2	b1-b3,c1-c2,d1,d2
	Cellular response to injury:	1	2	b1-b3,c1-c2,d1,d2
2	Acute inflammation	1	2	b1-b3,c1-c2,d1,d2
3	Chronic inflammation:	2	4	b1-b3,c1-c2,d1,d2
4	Cell Regeneration	1	2	b1-b3,c1-c2,d1,d2
	Hemostasis & coagulation	1	2	b1-b3,c1-c2,d1,d2
5	Midterm exam	1	2	b1-b3,c1-c2,d1,d2
6	Neoplasia	2	4	b1-b3,c1-c2,d1,d2

7	Immunological disorders:	1	2	b1-b3,c1-c2,d1,d2
8	Pathology of infectious disease	2	4	b1-b3,c1-c2,d1,d2
	Genetic Disorders	1	2	b1-b3,c1-c2,d1,d2
	Final exam	1	2	b1-b3,c1-c2,d1,d2
Number of Weeks /and Units Per Semester 15			30	

VI- Teaching strategies of the course:

- Lectures using data show, video animation and seminars, electronic learning
- Solving Problem method, Laboratory work, directed reading, independent study and discussion

I. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Seminar on Molecular basis of cancer (oncogenes & tumor suppressor genes)	a3,b1,d2	8	5
2	Lab report	b1-b3, c1-c2	Every week	5
3	Presentation, homework	a1, d1, d2	6	5

II. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Presentation & Home works	6	5	5%	a1, d1, d2
2	Lab Report	ALL	5	5 %	b1-b3, c1-c3
3	seminar	Every week	5	5%	b1-b3, c1-c2
4	Quizzes	3,5,10	5	5%	a1,a2,b1,b2
5	Midterm exam	7	10	10%	a1-a3, b1-b3, d1, d2
	Midterm practical	8	10	10%	b1-b3,c1-c2,d1,d2
6	Final Exam (theoretical)	16	40	50%	a1-a3,b1-b3,d1,d2,
7	Final Exam (practical)	15	20	20%	b1-b3,c1-c2,d1,d2
	Total		100	100%	

VII- Learning Resources:

•

1- Required Textbook(s) (maximum two).

1- Cotran RS, Kumar V , Collin T, Robbins SL, (2020), Robbins Pathologic Basis of Disease: 10th edition, , W.B.Sunders Co. Philadelphia, London, Toronto, Montreal, Sydney, Tokyo

2- Essential References.

- 1- Simon Herrington. C (2020), Muir's Textbook of Pathology, CRC Press, SBN 9780367146726.
- 2- Alasdair D.T. Govan, R. MacFarlane (Editor). Pathology Illustrated. Last edition . Churchill Livingstone. ISBN-10: 044305956X

3- Electronic Materials and Web Sites etc.

www.webpathology.com
www.webpathology.com
<http://www.afip.org/consultation/vetpath/index.htm>
<http://web.vet.cornell.edu/public/oed/neuropathology/index.asp>
Other learning material such as computer-based programs/CD, professional standards/regulations
Other learning material such as computer-based programs/CD, professional standards/regulations

VIII- Course Policies:

١	Class Attendance: Absence from lectures and/or tutorials shall not exceed 25%. Students who exceed the 25% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college shall not be allowed to take the final examination and shall receive a mark of zero for the course.
٢	Tardy: Students should be attending the classes, as it has required for the assessments if the student is 15 minutes late in attending to the class for more than two classes he will loss 50% of quizzes mark -
٣	Exam Attendance/Punctuality: All examination and their roles will be according to Students affairs regulations
٤	Assignments & Projects: Student, who is submitting the assignments or the projects on time, will be awarded good percentage in grading of participation.
٥	Cheating: All students must be an ideal behavior, respect each other, their teachers, and respect the roles of the colleague. In addition, students should follow safety roles while working in the lab. Those who has been caught in any cheating case will be punished according to the Students affairs regulations
6	Plagiarism: Student will be punished depend upon gravity of the action and according to Students affairs regulations which might be ranged from rewriting the homework to suspension or dismissal
7	Other policies: Using mobile or another electronic device capable to store or transfer data in class during the lecture or the exam is forbidden.

Medical Bacteriology I

I. Course Identification and General Information:						
1	Course Title:	Medical bacteriology I				
2	Course Code & Number:	B1102253				
3	Credit hours: 3	C.H				Total
		Th.	Seminar	Pr.	Tr.	
		2		2		3
4	Study level/ semester at which this course is offered:	Level2, second semester				
5	Pre –requisite (if any):	B1102251				
6	Co –requisite (if any):					
7	Program (s) in which the course is offered:	Bachelor of laboratory Medicine				
8	Language of teaching the course:	English				
9	Location of teaching the course:	Thamar University – Faculty of Medical Sciences				
10	Prepared By:	Dr. Abdulrahman Al-Haifi				
11	Date of Approval	2021				

II. Course Description:

This course takes a clinical approach to studying Gram Positive Bacteria, the methods used to classify, control, and to know the pathogenesis processes and disease caused by Gram positive bacteria. An understanding of these principles will be used to isolation and identification of Gram-positive bacteria.

III. Course Objectives:

The overall aims of the course are:

1. To Overview of disease(s) associated with Gram positive bacterial family (pathogens and microflora)
2. To know the structure, physiology, Mechanism of pathogenesis, and environmental requirements of bacteria.
3. To use techniques in Bacteria isolation and identification.
4. To identify the antibacterial reagents and drug resistance of bacteria
5. Discussion of current literature relevant to topics presented

IV. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
A2	a1- Able to describe the structure, morphology and life cycle of medically important Gram-Positive bacteria.
A3	a2- Describe growth, physiology, metabolism and genetic mechanisms of bacteria, especially those of importance for pathogenic Gram Positive bacterial
A2	a3- Describe mechanisms of spread, virulence and pathogenesis for medically important bacteria and methods and strategies for treatment and prophylaxis of such microorganisms

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:

B1	b1-Select suitable specimen and procedure for isolating and identification of suspected pathogen.
B.2	b2- Control sterilization processes and aseptic procedures to prevent a contamination.
B.3, B4	b3- evaluate the results of clinical investigation and integrate the microbiology lab results with the clinical and other lab results.

Professional and Practical Skills	
Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1	c1 perform bacteriological growth methods and sterile techniques used when handling bacteria.
C4	c2 Perform diagnostic tests to identify medically important bacteria
C6	c3 Properly use laboratory techniques for achieving accurate isolation and identification of bacterial infection

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1	d1 Participate as a Member of a Team: contribute to group effort.
D2	d2 Communicate Information by Using Computers to Process Information.

V. Alignment Course Intended Learning Outcomes

(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 Able to describe the structure, morphology and life cycle of medically important Gram-Positive bacteria.	<ul style="list-style-type: none"> - Lectures - Discussion Sessions - Assignments 	<ul style="list-style-type: none"> - Periodic exam (Quizzes) - Evaluate assignments - Mid & final exam
a2 Describe growth, physiology, metabolism and genetic mechanisms of bacteria, especially those of importance for pathogenic Gram Positive bacterial		
a3 Describe mechanisms of spread, virulence and pathogenesis for medically important bacteria and methods and strategies for treatment and prophylaxis of such microorganisms		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1 Select suitable specimen and procedure for isolating and identification of suspected pathogen.	<ul style="list-style-type: none"> - Discussion Sessions - Problem solving 	<ul style="list-style-type: none"> - Oral presentations - Evaluate assignments

b2	Control sterilization processes and aseptic procedures to prevent a contamination.	- Group discussion - Assignments	- Mid & final exam
b3	Evaluate the results of clinical investigation and integrate the microbiology lab results with the clinical and other lab results.		

(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	perform bacteriological growth methods and sterile techniques used when handling bacteria.	- Practical session - Lab demonstration	- LAB report - Evaluate assignments Practical exam
C2	Perform diagnostic tests to identify medically important bacteria		
C3	Properly use laboratory techniques for achieving accurate isolation and identification of bacterial infection		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
d1	Participate as a Member of a Team: contribute to group effort.	- Discussion Sessions - Assignments that require collecting information from the internet.	- Oral presentations
d2	Communicate Information by Using Computers to Process Information.		

V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction	- History of Bacteriology - Bacterial Structure Nutrition, Growth and division. - Classification of Gram positive bacteria	1	2	a1, a2, b1, b2, b3, d2
2	Staphylococcus	- Classification of Staphylococci on the bases of Coagulase activity <ul style="list-style-type: none"> ● Staphylococcus aureus ● Other Staphylococcus - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification and distinguished of Staphylococci - Recognize and distinguished Staphylococci in the laboratory	2	4	a1, a2, b1, b2, b3, d2

3	Streptococcus and Enterococcus	<ul style="list-style-type: none"> - Classification of Streptococci on the bases of types of hemolysis activity and Lancefield reaction. <ul style="list-style-type: none"> ● Streptococcus pyogens and other β hemolytic Streptococci ● Streptococcus pneumonia and other α hemolytic Streptococci ● Non-hemolytic streptococcus - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification and distinguished of Streptococci - Recognize and distinguished Streptococci in the laboratory. 	3	6	a1, a2, a3, b1, b2, b3, , d2
4	Corynebacteria	<ul style="list-style-type: none"> - Classification and general characteristics - Corynebacterium diphtheriae - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification. - Recognize and distinguished Corynebacterium diphtheriae in the laboratory 	1	2	a1, a2, b1, b2, b3, c1, d2,
5	Clostridia	<ul style="list-style-type: none"> - Classification and general characteristics <ul style="list-style-type: none"> ● Clostridium perfringens ● Clostridium difficile ● Clostridium tetani ● Clostridium botulinum ● Other types of clostridia - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification. - Recognize and distinguished in the laboratory 	2	4	a1, a2, b1, b2, b3, , d2
6	Bacillus	<ul style="list-style-type: none"> - Classification and general characteristics <ul style="list-style-type: none"> ● Bacillus cereus ● Bacillus anthracis - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification. - Recognize and distinguished in the laboratory 	2	4	a1, a2, b1, b2, b3, d2

7	Listeria	<ul style="list-style-type: none"> - Classification and general characteristics <ul style="list-style-type: none"> ● L. monocytogenes ● Other Listeria - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification. - Recognize and distinguished in the laboratory 	1	2	a1, a2, b1, b2, b3,, d2
	Mycobacteria	<ul style="list-style-type: none"> - Classification and general characteristics. <ul style="list-style-type: none"> ● Mycobacterium tuberculosis ● Mycobacterium leprae - Pathogenesis, virulence factors, Sources of infection, method of transmission of infection, and Types of infectious diseases. - Isolation and identification. - Recognize and distinguished in the laboratory 	2	4	a1, a2, b1, b2, b3, , d2
Number of Weeks /and Units Per Semester			14	28	

B – Case Studies and Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	- Components Microscope	1	2	a1, c1, d2
2	- Staining Methods	1	2	c1, c2, d1, d2
3	- Type of culture Media	1	2	b1, c1, c2, c3d1,
4	- Dilution and pour plating techniques.	1	2	b1,b2 c1, c2, d1,
5	- Identification and isolation of staphylococci	1	2	b1,b2 c1, c2, d1,
6	- Identification and isolation of Streptococci	2	4	b1,b2 c1, c2,c3 d1,
7	- Identification and isolation of Corynebacterium	1	2	b2 c1, c2, c3, d1,
8	- Identification and isolation of clostridium	1	2	b2 c1, c2, c3,d1,
9	- Identification and isolation of Bacillus	1	2	b2 c1, c2, d1,
10	- Identification and isolation of Mycobacterium	1	2	b2 c1, c2, c3 d1,
11	Exam	1	2	b1,b2 c1, c2,c3 d1,
Number of Weeks /and Units Per Semester		12	24	

VI. Teaching strategies of the course:

- Lectures
- Discussion sessions
- LAB Class
- Media Presentations: Power Point, Video
- Assignments
- Solving of problems

VII. Assignments:

No	Assignments	Mark	Week Due	Aligned CILOs(symbols)
1	Participation	2.5	Weekly	a1, a2, b1, b2, d1, d2
2	Quizzes	2.5	Weekly	a1, a2, b1, b2 d1, d2
3	Research	2.5	6 th W	a1, a2, b1, b2, d1, d2
4	Assignments	2.5	6 th W	a1, a2, b1, b2, c1, c2, d1, d2
5	Mid – Exam (theoretical)	10	7 th W	a1, a2, b1, b2, d1, d2
	Final Exam (practical)	20	15 th W	a1, a2, b1, b2, c1, c2, d1, d2
	Total score	40%		

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 & Homework, Tasks & Presentation	Fortnightly	7.5	7.5%	a1, a2, b1, b2, d1, d2
2	Quizzes	W6	2.5	2.5%	a1, a2, b1, b2, c1, c2, d1, d2
3	Mid-Term exam	W8	10	10%	a1; a2; a3; b1; b2; c1; c3
4	Practical reports	W12	5	5%	a1, a2, b1, b2, c1, c2, d1, d2
5	Final exam practical	W 15	15	15%	b1, b2, c1, c2, c3d1, d2
6	Final Exam theory	W16	60	60%	a1-a3, b1, b2, d1, d2
Total			100	100%	

IX. Learning Resources:

- *Written in the following order: (Author - Year of publication - Title - Edition - Place of publication - Publisher).*

1- Required Textbook(s) (maximum two).

- 1) Barer, M. R., & Irving, W. L. (2018). Medical Microbiology E-Book: A Guide to Microbial Infections (19th Edition). Elsevier Health Sciences.
- 2) Tille, P. (2015). Bailey & Scott's diagnostic microbiology-E-Book (14th Edition). Elsevier Health Sciences.

2- Essential References.

- 1) Practical Handbook of Microbiology; By Goldman E, 2015, 3rd edition.
- 2) Gracia, L. (2016). Diagnostic Medical Parasitology (6th Edition). Washington, D.C. : ASM Press.

3- Electronic Materials and Web Sites etc.

- <https://uqu.edu.sa/lib/917>
- <http://www.microbelibrary.org/>
- <http://pathmicro.med.sc.edu/book/virol-sta.html>.
- http://www.biology.arizona.edu/immunology/microbiology_immunology.html

Course Specification of Medical Parasitology

I. Course Identification and General Information:						
١	Course Title:	Parasitology I				
٢	Course Code & Number:	B1102281				
٣	Credit hours: 3	C.H				TOTAL
		Th.	Seminar	Pr	Tr.	
		2		1	3	
٤	Study level/ semester at which this course is offered:	2 nd Laboratory Medicine, Pharm. D. and Nursing				
٥	Pre –requisite (if any):	Medical Biology				
٦	Co –requisite (if any):					
٨	Program (s) in which the course is offered:	Bachelor Degree Course: Laboratory Medicine, Pharm. D. and Nursing				
٩	Language of teaching the course:	English				
١٠	Location of teaching the course:	Building B, Faculty of Medical Sciences, Thamar University Main Campus.				
11	Prepared By:	Assoc. Prof. Dr. Abdulelah H. Al-Adhroey				
12	Date of Approval					

II. Course Description:

The Medical Parasitology course provides an overview of human parasites and their diseases. Topics include the basic concept of medical helminthology, protozoology and entomology: types of parasites, host vector relationship, classification, mode of infections and effect of parasites upon host, distribution, morphology, life cycle, clinical features, pathology, treatment, prevention and control.

III. Course Objectives:

After completing this program, students would be able to recognize basic concepts of medical helminthology, protozoology and entomology

IV. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
	a1 Define and classify the medically important morphology and clinical parasites criteria
	a2 Classify parasites of medical importance in its broad scientific taxonomic positions and their habitat in the human body
	a3 List the definitive host, intermediate host and reservoir host if found in case of parasitic infections and zoonosis.
	a4 Classify arthropods that are mechanical and biological vectors of important human pathogens.
	a5 Relate the life cycle of different parasites of medical importance with pathogenesis (in terms of host- parasite relationship) of different parasitic infections.
	a6 Correlate the life cycle of different parasites of medical importance in terms of host- parasite relationship to clinical picture
	a7 Describe the infective stage, diagnostic methods and prevention and control methods of different parasitic infections and infestations.

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs	Intellectual Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
B1	b1 Correlate the structural and functional alteration due to different parasites with the clinical picture of diseases caused by them in terms of the host parasite relationship.
-	b2 Analyze and integrate results of history, physical examination and investigations of a case scenario to reach differential diagnosis and diagnosis of the underlying parasitic cause (s).
	b3 Select appropriate diagnostic methods (direct and indirect) of different parasites according to life cycle.
	b4 Interpret the geographical distribution for areas where parasites are found (especially endemic areas) as a useful information in the patient history.

Professional and Practical Skills

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Professional and Practical Skills PILOs	Professional and Practical Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
C1	c1 Identify the different stages of parasites using simple or compound microscope or diagrams and comment on diagnostic, infective stages or vectors of disease transmission.
	c2 Examine to identify the snails (intermediate hosts of some parasites) that can be of epidemiological importance.
	c3 Practice the basics of safety procedures during laboratory classes

Transferable (General) Skills :	
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)	
Transferable (General) Skills PILOs	Transferable (General) Skills CILOs
After completing this program, students would be able to:	After completing this course, students would be able to:
D1	d1 Adopt the principles of lifelong learning needed for continuous professional development.
	d2 Evaluate information including the use of information technology where applicable

V. Alignment Course Intended Learning Outcomes

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
	Interactive lectures	Exam
	Discussion	Assignments
	Brain Storm	Presentations
	Seminars..	Quizzes

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
	- Interactive lectures	Exam
	- discussion and dialog	Assignments
	- Brain Storm	Presentations.
	- Problem solving	Oral presentations.
	- Seminars.	
	- Case study	

(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
	Practical training in the laboratory.	Practical Exams
	Group (Small group) discussion	Assignments
	Lab activities	Presentation/ observation
		Lab. Reporting / Report case

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
	- Independent study	
	- Group work activities	
	- Written researches.	

V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of	Contact hours	Learning Outcomes
-------	-------------------	-----------------	-----------	---------------	-------------------

			Weeks		(CILOs)
1	Introduction to Medical Parasitology	<ul style="list-style-type: none"> - Common terms of parasitology, types of parasites, host vector relationship, classification, mode of infections and effect of parasites upon host, distribution, morphology, life cycle, clinical features, pathology, treatment, prevention and control. 	1	2	a1-a3; b1
2	Soil-transmitted Helminths and Enterobius vermicularis	<ul style="list-style-type: none"> - Ascariasis: <i>Ascaris lumbricoides</i> - Trichuriasis: <i>Trichuris trichiura</i> - Hookworms: <i>Ancylostoma duodenale</i>, <i>Necater americanus</i> 	1	2	a1-a2; b2-b3
3	Soil-transmitted Helminths and Enterobius vermicularis	<ul style="list-style-type: none"> - <i>Strongyloides stercoralis</i> - Cutaneous and visceral larva migrans - <i>Entembius vermicularis</i> 	1	2	a1-a2; b2-b3
4	Tissue Nematodes	<ul style="list-style-type: none"> - <i>Trichinella spiralis</i> - Filariasis: <i>Wuchereria</i> species, Loiasis, <i>Loa loa</i> - Onchocerciasis: <i>Onchocerca volvulus</i> - Dracunculiasis: <i>Dracunculus medinensis</i> 	1	2	a1, a2, b2-b3
5	Trematoda	<ul style="list-style-type: none"> - Schistosomiasis: <i>Schistosoma haematobium</i>, <i>S. mansoni</i>, <i>S. species</i>. - Fascioliasis and Fasciolopsiasis: <i>Fasciola hepatica</i> and <i>F. gigantica</i> and <i>Fasciolopsis buski</i> - <i>Heterophyes heterophyes</i>, <i>Metagonimus yokogawai</i> - <i>Paragonimus westermani</i> 	1	2	a1-a7 b1-b4
6	Cestoda	<ul style="list-style-type: none"> - Taeniasis: <i>Taenia saginata</i> and <i>T. solium</i>, Cysticercosis - Hydatid disease: <i>Echinococcus</i> sp. - Hymenolepiasis: <i>Hymenolepis nana</i>, <i>H. diminuta</i> - <i>Dipylidium caninum</i>, <i>Diphyllobothrium latum</i> and sparganosis 	1	2	a1-a7; b2,b4
7	Midterm Exam.				
8	Amoebae	<ul style="list-style-type: none"> - <i>Entamoeba histolytica</i> - <i>Acanthamoeba</i> species - <i>Naegleria</i> species - Differentiation of cysts of non-pathogenic species of amoebae that can be found in faeces. 	1	2	a1-a7 b2-b3
9	Flagellates & Ciliates	<ul style="list-style-type: none"> - <i>Giardia lamblia</i> - <i>Trichomonas vaginalis</i> - <i>Trypanosoma</i> species 	1	2	a1-a7 b1-b4

		- <i>Leishmania</i> species - <i>Balantidium coli</i>			
10	Blood and Tissue coccidia	- <i>Plasmodium</i> species - <i>Toxoplasma gondii</i>	1	2	a1-a7 b2-b3
11	Intestinal coccidia and Microsporidia	- <i>Isospora belli</i> - <i>Cryptosporidium parvum</i> - <i>Cyclospora cayetanensis</i> - <i>Microsporidia</i> ○ <i>Encephalitozoon</i> species ○ <i>Enterocytozoon</i> species	1	2	a1-a7 b2
12	Arthropoda	- Insecta: ○ Mosquitoes, fleas, flies, lice and bugs	1	2	a1-a7 b2,b3
13	Arthropoda	- Arachnida: ○ Ticks, mites and scorpion - Crustacea: ○ Cyclops	1	2	a1-a7 b2,b3
14	Immunity of parasite infection	- Immunity of parasite infection	1	2	a1-a7 b2,b3
15	Final Exam.				
Number of Weeks /and Units Per Semester					

B – Case Studies and Practical Aspect: (if any)

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction to diagnostic parasitology	1	2	c 1.
2	Stool Examination (Demonstration): Direct and concentration methods and specimen collection and transportation	1	2	c1,c3
3	Blood, urine and other body fluid examination and specimen collection and transportation	1	2	c1,c3
4	Diagnosis of Nematode	1	2	c1.c3
5	Diagnosis of Trematode	1	2	c1- c3
6	Diagnosis of Cestode	1	2	c1,c3
7	Midterm Exam.	1	2	c1-c3
8	Diagnosis of Protozoa Trophozoites and cysts	1	2	c1,c3
9	Blood Smear: Preparation for malaria examination	1	2	C3
10	Sero-diagnosis of parasitic infections	1	2	C2, c3
11	Molecular techniques in diagnosis of parasitic infections	1	2	C2; C3
12	Diagnostic entomology: Insecta	1	2	c1, c3
13	Diagnostic entomology: <i>Arachnida</i> and <i>Crustacea</i>	1	2	C1, c3
14	Final Exam	1	2	
Number of Weeks /and Units Per Semester				

VI. Teaching strategies of the course:

- 1- Interactive lectures.
- 2- Group discussion.
- 3- Practical training in the laboratory.
- 4- Seminars.
- 5- Written researches.

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Attendance; Quiz (2)			

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	Quiz (2)	3	3	3%	a1- a3
2	Attendance	Continuous	5	5%	
3	Written midterm test	7	10	10%	a1- a7
4	Practical midterm exam and Lab. reports	7	10	10%	c1- c3
5	Research and seminars	11	2	2%	a1-a7; b1- b4; d1- d2
6	Practical final exam	15	10	10%	c1-c3
7	Final Exam (Oral and Written)	15	60	60%	a1- a7; b1- b4
Total			100	100%	

IX. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

- 1- Medical Microbiology: By F.H., Kayser, et al.
- 2- District Laboratory Practice in Tropical Countries Part 1: By Monica Cheesbrough

2- Essential References.

- 1- Topley & Wilson's microbiology & microbiological infections By F.E.G. Cox, Derek Wakelin, Stephen H. Gillespie and Dickson D. Despommier
- 2- Colour Atlas of Tropical Medicine and Parasitology By W. Peters & H.M. Gillies

3- Electronic Materials and Web Sites etc.

- 1- Parasites online: <http://WWW.parasitesonline.net/homepage.htm>.
www.getbodysmart.com/ap/histology/menu/menu.html
- 2- <http://WWW.parasitology.org.uk>
- 3- <http://WWW.cvm.okstate.edu/~users/jcfox/htdocs/clinpara/index.htm>