



**Ministry of Higher Education  
Kabul University of Medical Science  
Faculty of Allied Health Sciences**



**Curriculum and Course Content of Bachelor of Science in  
Medical Laboratory Technology Program**



**First Revision 2018**



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## **Introduction**

Health for all implies both a revolution and decentralization, demanding in the role of all health professional at every level of the health care system. This concept has far-reaching implications for Medical technology practice increasingly.

The Kabul University of Medical Science has established the Medical Laboratory Technology department in the frame of Allied health science faculty as bachelor degree according the need assessment of the society and health community.

The curriculum of subject is described as a throbbing pulse of a nation. By viewing curriculum, one can judge the stage of development and its pace of socio-economic development of a nation. With the advent of new technology, the world has turned into a global village. In view of tremendous research taking place world over new ideas and information pours in like of a stream of fresh water, making it imperative to update the curricula after regular intervals, for introducing latest development and innovation in the relevant field of knowledge.

The Curriculum Guide contains a detailed description of the subjects currently applying to the Medical Technology faculty program according to the ministerial order.

This unified template was aimed to inculcate broader base of knowledge in the clinical, Para clinical and basic science subjects etc. in addition to major discipline of study the degree course requires to be completed in 4-years/8-semester and House Job.

The department of the Medical technology is established in 2011 which the total credits in full faculty courses is 141 (last year house job included), duration of each lecture is 50 minutes (1 credit) and each practical work 100 minutes (1 credit). In the department of Medical laboratory Technology the subjects are categorized in universities inclusive, essential and professional subjects.

The last revision of the curriculum was done in 2018 according the need assessment of the target learners and by the cooperation of Medical laboratory science faculty team of the Minnesota University by donation of the USWDP.

**Faculty of Allied Health Science**  
**Curriculum and Syllabus**  
**B.Sc. Medical Laboratory technology**

**Title of course**

**“BACHELOR OF SCIENCE IN MEDICAL LABORATORY TECHNOLOGY”**

**B.Sc. (MLT)**

**Background and Developmental history and of the faculty**

Undergraduate program of Medical laboratory technology is exists in the list of undergraduate programs of many international universities. During its development this field is called with different titles as Medical laboratory science,(MLS), clinical laboratory science and medical laboratory technology.

In Iran this field was established in many universities such as Tehran,Asfahan ,Shiraz and Tabriz universities in the year of 1347.

In the year of 2012 faculty Allied Health science faculty was established within framework of Kabul Medical University. Title of programs in Allied Health Science faculty is as follows:

- Bachelor of Science in Medical laboratory technology-B.Sc(MLT)
- Bachelor of science in Anesthesia technology-B.Sc (AT)
- Bachelor of Science in Radiology
- Bachelor of Science in physiotherapy

Right now two department of Allied health faculty (MLT and AT)are active with 11 lecturers.

The lecturers of Medical Laboratory Technology are five persons as follow:

- 1-Teaching assistant Dr.Mahdawi Joya(MD)
- 2- Teaching assistant Dr.Mohammad Khalid Bahadur(MD)
- 3- Teaching assistant .Mohamnad Reza Abdullahi(Pharm D)
- 4- Teaching assistant Ruhullah Vasiq(Master of immunology)
- 5- Teaching assistant Mr. Khalid Rezayee (Bachelor of Medical Lab Technology)

The current situation of faculty: it has its own building in KUMS campus having 4 lecture rooms equipped with LCD, projector and chairs, One laboratory room, IT hall and

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administrative offices(directorate, teaching office, facility rooms equipped with lab top computers for teachers) .

**Background of the MLT department:**

The department is named Medical Laboratory technology that is established in 2012 with total credits (141) that are categorized in three university inclusive, essential and professional categories for each semester as follow:

Semester	University inclusive	Essential	Professional
First	3	4	1
Second	3	3	2
Third	2	0	5
Fourth	2	0	4
Fifth	1	2	4
Sixth	1	0	5
Seventh	1	3	4
Eight	1	Internship	Internship

**Need Assessment for Target Learners:**

As there is daily development and improvement in diagnostic methods and laboratory equipment and instruments in the society, so there is consideration to graduate B.Sc. Students in this field who can overcome society demand in performing laboratory services.

Different facts including social status of population, much demand of the new technology in the health sector, complains from weak laboratory practices, efficiency of the laboratory practices in the field of medical technology, common diseases in the country and region, available facilities and level of knowledge of candidates of the medical school are considered for the preparation of this curriculum. This document can be revised and updated according to social evolution and variation of education priorities in the country.

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From other hand, the graduated students from this program have been hired in governmental and private laboratories and encounter to some problems and they have commented the faculty to add some new essential and professional subjects in the curriculum and increase the credit numbers of some subjects.

Also in the exchange program between MLT of KUMS and MLS of Minnesota university, the evidence based comments have been documented for the revision of the curriculum.

So all of these evidences has strong reasons for the revision of the curriculum.

### **Goals for revision of curriculum**

- Prepare students to gain international standards.
- Assure that the students achieve the expected outcomes of MLT course.
- Providing Standardize primary curriculum of MLT according to society demand.
- Avoid duplications in different subjects and emphasize on professional subjects and internship program.

### **Vision**

The vision of medical laboratory technology program is to educate students (in bachelor level) in medical laboratory technology field for standard laboratory services in the society.

### **Learning objectives /Program Outcome (PO):**

After graduation the students will be able to:

1. Establish and manage a clinical or Research laboratory.
2. Perform routine and special investigative procedures in medical Laboratory.
3. Analyze theoretical and practical knowledge which will be efficient for their future work plan in the field of Medical laboratory technology in the society.
4. Undertake their postgraduate program (Master and PhD) in medical laboratory technology in foreign countries.

### **Introduction of the content:**

#### **Duration of course**

Duration of course is four academic years which consists of three and half year theory and practical works and 4 months internship in laboratory of different hospitals.

#### **Eligibility for admissions**

The candidates for this program is selected according to entrance exam (Kantor exam) .

## **Eligibility for graduation**

The students will be graduated after completion of four year course which includes all credits of theory, practical works, internship and defense of monograph.

## **Credits Guidelines**

One semester credit hour is assigned in the following ratio of component hours per week devoted to the course of study;

### **A-Lectures**

Normally, one theory credit hour is associated with class meeting for 50 minutes per week for an entire semester (16weeks) or the equivalent 800 semester- minutes, excluding final examinations.

### **B-Laboratory Skills**

One credit of laboratory work is equivalent to two study hour which is 100 minutes or 32 study hours in a semester.

One credit of internship is equivalent to three study hour or 150 minutes or 2.5 hour so for one semester (16 weeks), it is 40 hour (16x2.5). According to this students will complete one credit of internship when they work 40 hours in 16 weeks.

Totally B.Sc. Medical Laboratory Technology Program is 141 credits that are distributed in four (inclusive, essential, professional and monograph & internship) category, the percentage for each category is as follows:

- **University inclusive is 14.20%**
- **Essential subjects is 25.53%**
- **Professional is 50.35%**
- **Internship and monograph is 9.92%**

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**Number of credits in four categories of subjects**

No.	Category	Subjects	Number of credits		Number of hours		Sum of credits	Sum of hours	Pre-requisite
			Theory	Practice	Theory	Practice			
1	University inclusive	Islamic Studies	8		128		8	128	None
2		Foreign Language and Medical terminology		8		256	8	256	None
3		Information Technology		4		128	4	128	None
<b>Total</b>			<b>8</b>	<b>12</b>	<b>128</b>	<b>384</b>	<b>20</b>	<b>512</b>	
1	Essential subjects	Anatomy	2	1	32	32	3	64	None
2		Cellular and Molecular Biology	2	1	32	32	3	64	None
3		Physics for health science	2	1	32	32	3	64	None
		Math	2	1	32	32	3	64	None
4		Chemistry	2	1	32	32	3	64	None
5		Biostatistics	1	1	16	32	2	48	Math
6		Behavioral Sciences	1	0	16	0	1	16	None
7		MLT Research Methods	2	1	32	32	3	64	Biostatistics
8		First aids	1	1	16	32	2	48	None
9		Histology	4	2	64	64	6	128	Cellular Biology
10		Occupational Health	1	0	16	0	1	16	None
11	Human Physiology	2	1	32	32	3	64	Cellular Biology	

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12		Nutrition	2	0	32	0	2	32	None
13		Medical ethics	1	0	16	0	1	16	None
<b>TOTAL</b>			<b>25</b>	<b>11</b>	<b>400</b>	<b>352</b>	<b>36</b>	<b>752</b>	
1	<b>Professional</b>	Biochemistry (General)	2	2	32	64	4	96	Chemistry
2		Biochemistry clinical 1,2,3	6	6	96	192	12	288	General biochemistry
4		Cytology and cytotechnology	2	1	32	32	3	64	Histology and Cell biology
6		Histotechnology	2	1	32	32	3	64	Histology
7		Hematology-1-2-3	6	4	96	128	10	224	Physiology
8		Immunology and serology	3	1	48	32	4	80	Microbiology
9		Immunoematology	2	1	32	32	3	64	Physiology Immunology
10		Fundamental of laboratory technology	2	1	32	32	3	64	None
11		Microbiology	8	5	128	160	13	288	Cellular Biology
13		Pathology (General & systemic	4	2	64	32	6	96	Biology and histology
14		Parasitology	2	2	32	64	4	96	Biology
15		Qualitative Laboratory Management and automation	2	1	32	32	3	64	Biochemistry
16		Toxicology	2	1	32	32	3	64	Biochemistry
<b>TOTAL</b>			<b>43</b>	<b>28</b>	<b>688</b>	<b>864</b>	<b>71</b>	<b>1552</b>	

<b>Categories of Subjects, number of Credits and its percentage for Medical Laboratory Technology program , Allied Health Sciences Faculty</b>					
<b>No.</b>	<b>Subjects</b>	<b>No. of Theory credits</b>	<b>No of practice credits</b>	<b>Total of credits</b>	<b>Percent of credits</b>
1	Inclusive	8	12	20	14.20%
2	Essential Subjects	25	11	36	25.53%
3	Professional Subjects	43	28	71	50.35%

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4	Internship	-	10	10	7.10%
5	Monograph	-	4	4	2.82%
<b>Total</b>		<b>76 (53.90%)</b>	<b>65 (46.10%)</b>	<b>141</b>	<b>100%</b>

## **Teaching/Learning Methods**

Active learning is the strategic approach in Faculty of Medical laboratory Technology, That is, learners interact more with the subject matter to construct and own knowledge .They are not empty vessels into whom Faculty pour knowledge. Active learning activities promote thoughtful engagement, encourage analytical thinking and reasoning, foster the integration and application of knowledge, and are designed around well-defined learning objectives.

Students' engage in solving problems, sharing ideas, giving feedback, and teaching one another. Active learning requires Faculty who facilitate and emphasize the development of students' skills. Active learning requires collaboration in both teaching (e.g., working teams of instructors, instructional designers, educational technology professionals, etc.) and learning (e.g., small groups).Active learning incorporate assessment as part of curriculum and instruction to ensure coherence and consistency. Active learning can enhance academic achievement ,promote retention and application of knowledge ,enhance understanding and mastery of course content, improve critical thinking and problem solving, improve clinical competence, enhance interpersonal skills, promote teamwork, increase student engagement, promote positive student attitudes, increase course satisfaction, and encourage self-directed lifelong learning.

The following learning methods, taken in part from princes(2004) review of active learning research, provides the generally accepted definitions and uses of common active learning terms.

- Active Learning**
- Collaborative Learning**
- Cooperative Learning**
- Team-Based Learning(TBL)**
- Case –Based Learning(CBL)**
- Problem-Based Learning(PBL)**
- E-Learning**

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In brief our teaching – learning methodology fulfill by the following approaches’:

- **Lecture with Audio – Visual Aids;**
- **Laboratory practice;**
- **Small Group Tutorials(Problem Based Learning-PBL,Case Based Learning-CBL,etc);**
- **Role play (Simulation)**
- **Bedside Learning(Clerkship and Rotations)**
- **Self – Learning (Learning to Learn)**
- **E- learning;**
- **Conferences**

### **Implementation of the Program**

a-Infra structure:

The building of MLT has four lecture room,one laboratory facility,one room for MLT for running the program of USWDP,one room for teachers and one room for Lab Technicians.

b-Human resources:

Currently MLT has five academic professors(two MD, one Pharm D, one Master of immunology and one Bachelor of MLT)and two Lab technicians.

c-Equipement and Instrument:

The department of MLT is equipped by meeting table, couches, chairs and one lab top computer.as well as four lab top computers, one copier, one camera, six chair and meeting table that are donated by USWDP .also the lecture rooms are equipped by chairs and projectors. The laboratory room contains some facilities and instruments for Biochemistry, Microbiology and Hematology practical tests.

### **Exam regulations**

#### **1. Attendance:**

Seventy five percent attendance in a subject for appearing in the examination

Is compulsory provided he /she has 80% attendance in non –lecture teaching.i.e.seminars, group discussion, tutorials, demonstration, practical’s in health facilities (Primary, Secondary and Tertiary).

#### **2. Internal Assessment**

- **It shall be based on day-to-day assessment, evaluation of student assignment, preparation for seminar, clinical case presentation etc.**
- **Regular periodical examination shall be conducted throughout the course;**

- **Day-Today records should be given importance during internal assessment;**
- **Weightage for the internal assessment shall be 20% of the total marks in each subject.**

### **Some examples of internal assessment are as follows:**

- **Preparation of subject for students seminars.**
- **Preparation of clinical case for discussion.**
- **Clinical case study/problem solving exercise.**
- **Proficiency in carrying out a practical or skill in small research project.**
- **Multiple choice question (MCQ) test after completion of a system course.**
- **Each item tested shall be objectively assessed and recorded;**
- **Some of the items can be assigned as Home Work /Vacation Work.**

### **3. University Examinations:**

**A-Theory paper;** Will be prepared by the examiners as prescribed nature of questions will be short answer type/Objective type and marks for each part indicated separately.

**B. Practical /Clinical;** Will be conducted in the laboratories or hospital wards, Objective will be to assess proficiency in skills, conduct of experiment, interpretation of data and logical conclusion, Clinical cases should preferably include common disease not esoteric syndromes or rare disorders. Emphasis should be on candidates' capability in eliciting physical signs and their interpretation.

**C-Viva /Oral;** Includes evaluation of management approach and handling of emergencies student skills in interpretation of common investigation data, X-rays, identification of specimens, ECG, etc.

### **E-Rare Cases/Obscure Syndromes and long cases;**

Shall not be put for final examination

### **Techniques of Assessment and Evaluation:**

- Multiple choice Questions(MCQs)
- Extended Matching Questions(EMQs)
- Short Answer Questions(SAQ)
- Mini- Cases(MC)
- PBL or Tutorial Performance Assessment(PBL-TPA)
- Objectives Structured Clinical Examinations(OSCE)

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- Traditional Clinical Examinations.
- Clinical Skills Learning Assessment(CSLA)
- Visits/Case Report Assessment.

**Examination and Marks distribution**

**Semester Examination Time Table:**

- First Semester Final Examination Starting Date:6<sup>th</sup> July(15<sup>th</sup> Sara tan)
- Second Semester Final Examination Starting Date:20<sup>th</sup> December(1<sup>st</sup> Jade)

**Distribution of Marks:**

**A-Subject with practical course**

1-Viva voce and Practical exam score total 40Marks includes:

- |             |          |
|-------------|----------|
| - Practical | 20 Marks |
| - Viva voce | 20 Marks |

2-Semester Final Exam (written paper): 60 Marks

Total End –Semester examination Score: 100 Marks

**B-Subjects without practical course**

1-Viva voce 20 Marks

2-Semester Final Exam (written paper) 20 Marks

Total End Semester Final Exam Score 100 MARKS

**General comparison of revised with previous curriculum**

1. Subjects divided into three categories (inclusive, essential and professional)
2. Total credits increased to 141 from previously 136.
3. Monograph is added with 4 credits.
4. Internship period is scheduled with 10 credits in 20 weeks.
5. New subjects as cytology, cytotechnology and nutrition are added.
6. Pathophysiology and histopathology are omitted.
7. Pathology, physiology and histology subjects are added.
8. Percentage of practical works changed from 70 credits (52.24%) to 65 credits (46.10%).
9. Inclusive subjects decreased from 22 credits to 20 credits.
10. Essential and professional subjects are decreased from 114 credits to 107 credits.

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**Title of subjects & hours of study according to each semester**

Courses for the 1 <sup>st</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 1 <sup>st</sup> .								
Semester: 1 <sup>st</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML101	Islamic Studies	1	0	16	0	1	16
2	ML102	Foreign Language & Medical Terminology	0	2	0	64	2	64
3	ML103	Information Technology 1	0	2	0	64	2	64
4	ML104	Physics for Health science	2	1	32	32	3	64
5	ML105	Math	2	1	32	32	3	64
6	ML106	Chemistry	2	1	32	32	3	64
7	ML107	Occupational Health	1	0	16		1	16
8	ML108	Fundamentals of Medical laboratory technology	2	1	32	32	3	64
	<b>Total</b>	<b>Eight Subjects</b>	<b>10</b>	<b>8</b>	<b>160</b>	<b>256</b>	<b>18</b>	<b>416</b>

Courses for the 2 <sup>nd</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 1 <sup>st</sup> .								
Semester: 2 <sup>nd</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML201	Islamic Studies	1	0	16	0	1	16
2	ML202	Foreign Language & Medical Terminology	0	2	0	64	2	64
3	ML203	Information Technology 2	0	2	0	64	2	64
4	ML209	First Aid	1	1	16	32	2	48
5	ML210	General Histology	2	1	32	32	3	64
6	ML211	Biostatistics	1	1	16	32	2	48
7	ML212	Human Anatomy	2	1	32	32	3	64
8	ML213	Cellular and Molecular Biology	2	1	32	32	3	64
	<b>Total</b>	<b>Eight subjects</b>	<b>9</b>	<b>9</b>	<b>144</b>	<b>288</b>	<b>18</b>	<b>432</b>

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Courses for the 3th Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 2 <sup>nd</sup> .								
Semester: 3 <sup>rd</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML301	Islamic Studies	1	0	16	0	1	16
2	ML302	Foreign Language & Medical Terminology	0	2	0	64	2	64
3	ML314	General Microbiology	2	1	32	32	3	64
4	ML315	Human Physiology	2	1	32	32	3	64
5	ML316	General Biochemistry	2	2	32	64	4	96
6	ML310	Systemic Histology	2	1	32	32	3	64
7	ML317	General Pathology	2	1	32	32	3	64
	<b>Total</b>	Seven subject	<b>11</b>	<b>8</b>	<b>176</b>	<b>240</b>	<b>19</b>	<b>432</b>

Courses for 4 <sup>th</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 2 <sup>nd</sup> .								
Semester: 4 <sup>th</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML401	Islamic Studies	1	0	16	0	1	16
2	ML402	Foreign Language & Medical Terminology	0	2	0	64	2	64
3	ML414	Diagnostic Microbiology	2	2	32	64	4	96
4	ML418	Hematology -1 (Principals)	2	2	32	64	4	96
5	ML417	Systemic Pathology	2	1	32	32	3	64
6	ML416	Clinical Biochemistry-1	2	2	32	64	4	96
	<b>Total</b>	<b>Six Subjects</b>	<b>9</b>	<b>9</b>	<b>144</b>	<b>288</b>	<b>18</b>	<b>432</b>

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Courses for the 5 <sup>th</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 3 <sup>rd</sup> .								
Semester: 5 <sup>th</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML501	Islamic studies	1	0	16	0	1	16
2	ML504	Genetic	2	0	32	0	2	32
3	ML516	Clinical Biochemistry – 2	2	2	32	64	4	96
4	ML505	Behavioral sciences	1	0	16	0	1	16
5	ML518	Hematology – 2	2	1	32	32	3	64
6	ML506	Cytology & Cytotechnology	2	1	32	32	3	64
7	ML507	Parasitology	2	2	32	64	4	96
	Total	<b>Seven Subjects</b>	<b>12</b>	<b>6</b>	<b>192</b>	<b>192</b>	<b>18</b>	<b>384</b>

Courses for the 6 <sup>th</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 3 <sup>rd</sup> .								
Semester: 6 <sup>th</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML601	Islamic studies	1	0	16	0	1	16
2	ML616	Clinical Biochemistry- 3	2	2	32	64	4	96
3	ML618	Hematology-3	2	1	32	32	3	64
4	ML608	Histotechnology	2	1	32	32	3	64
5	ML609	Immunology and serology-2	3	1	48	32	4	80
6	ML614	Advanced microbiology 1(VM)	2	1	32	32	3	64
	Total	<b>Six Subjects</b>	<b>12</b>	<b>6</b>	<b>192</b>	<b>192</b>	<b>18</b>	<b>384</b>

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Courses for the 7 <sup>th</sup> Semester of Medical Laboratory Technology, Allied Health Sciences Faculty								
Class: 4 <sup>th</sup> .								
Semester: 7 <sup>th</sup> .								
No.	Code No.	Subjects	No. of Credits		No. of Hours		Sum of Credits	Sum of Hours
			Theory	Practical	Theory	Practical		
1	ML701	Islamic studies	1	0	16	0	1	16
2	ML718	Immunoematology	2	1	32	32	3	64
3	ML714	Advanced microbiology(VM)	2	1	32	32	3	64
4	ML710	Quality laboratory Management and automation	2	1	32	32	3	64
5	ML711	Medical Ethic for MLT	1	0	16	0	1	16
6	ML712	MLT Research Method	2	1	32	32	3	64
7	ML713	Toxicology	2	1	32	32	3	64
8	ML715	Nutrition	2	0	32	0	2	32
	<b>Total</b>	<b>Eight Subjects</b>	<b>14</b>	<b>5</b>	<b>224</b>	<b>160</b>	<b>19</b>	<b>384</b>

Courses for internship of Medical Laboratory Technology, Allied Health Sciences Faculty				
Class: 4 <sup>th</sup> .				
Semester: 8 <sup>th</sup> .				
No.	Code No.	Subjects	Weeks	Credits
1	ML801	Islamic Studies		1
1	ML816	Bacteriology and virology	4week	2
2	ML817	blood bank	2 weeks	1
	ML818	Hematology	4 weeks	2
3	ML819	Serology and immunology	2 week	1
4	ML820	Parasitology and mycology	2 week	1
5	ML821	Clinical biochemistry	6 week	3
	<b>Total</b>		<b>20 weeks</b>	<b>11</b>
<b>Notes:</b>				

No.	Code No.	Subjects	Credits
1	ML822	Monograph	4



Syllabus

First Year:First semester

Islamic studies 1

<b>Islamic studies 1</b>				
<b>Discipline</b>		<b>Religious</b>		
<b>Department</b>		<b>Islamic Studies</b>		
<b>Course Title</b>		<b>Basic concepts of Islamic Knowledge</b>		
<b>Course code</b>		<b>ML101</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>1<sup>th</sup></b>		
<b>Semester</b>		<b>1<sup>th</sup></b>		
<b>Number of Credits</b>		<b>1</b>	<b>Theory</b>	<b>1</b>
			<b>Practical</b>	<b>0</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>1</b>		<b>Basic concept of Islamic Knowledge</b>	<b>General Information, Information about the Islamic Culture</b>
<b>2</b>	<b>1</b>		<b>Basic concept of Islamic Knowledge</b>	<b>Importance of Knowledge in Islam, Quranic Verses and Hadith regarding Education.</b>
<b>3</b>	<b>1</b>		<b>Basic concept of Islamic Knowledge</b>	<b>Characteristics of Islamic Law, Quranic Verses and Hadith regarding Inventions and changes in human life.</b>
<b>4</b>	<b>1</b>			<b>Memorization and translation of Surah 95 – 114</b>
<b>5</b>	<b>1</b>			<b>Daily Duaa (prayers) accordig to Hadith and Sunnah</b>
<b>6</b>	<b>1</b>			<b>Daily Duaa (prayers) accordig to Hadith and Sunnah</b>
<b>7</b>	<b>1</b>			<b>Daily Duaa (prayers) accordig to Hadith and Sunnah</b>
<b>8</b>	<b>1</b>		<b>Basic concept of Islamic Knowledge</b>	<b>Characteristics of Islamic Law, Aim and Objective of Islamic Law</b>

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9	1		Basic concept of Islamic Knowledge	Aim and Objective of Islamic Law
10	1		Basic concept of Islamic Knowledge	Social main deviations
11	1		Definition, importance and ruling of Hijab in Islam	General information
12	1		Definition, importance and ruling of Hijab in Islam :	Value and importance.
13	1		Definition, importance and ruling of Hijab in Islam :	Concept of Virtue
14	1		Definition, importance and ruling of Hijab in Islam :	Quranic Verses and Hadith regarding Hijab.
15	1		Definition, importance and ruling of Hijab in Islam :	Islamic Rules regarding Makeup and women outgoing.
16	1		Definition, importance and ruling of Hijab in Islam :	Conditions for Hijab.
<p>1 Lecture = 50 minutes Hour per week = 1 Total credit = 1</p>				

### Goal:

Explanation of the Basic concept of Islamic Knowledge

### Course objective:

- ✓ Explain basic information about Islamic studies
- ✓ To understanding of the students regarding Islamic civilization
- ✓ To perform prayers and other worships
- ✓ To enhance the skill of the students for understanding of issues related to faith and religious life.

### Skills:

- ✓ To build up Communications skill.
- ✓ Basic concept of Islamic Knowledge
- ✓ Memorization and translation of Surah 95 – 114

### Teaching and learning strategies:

- ✓ Lecture
- ✓ Class and small group discussion

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✓ Self- study

**Evaluation:**

✓ Written final examination ..... 80%

✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**✓ References**

1. Quran
2. Hadis

Foreign Language & Medical Terminology 1

<b>Foreign Language &amp; Medical Terminology 1</b>				
<b>Discipline</b>		<b>English language</b>		
<b>Department</b>		<b>English department</b>		
<b>Course Title</b>		<b>ESP/Professional English &amp; General English</b>		
<b>Course code</b>		<b>ML102</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>1<sup>th</sup></b>		
<b>Semester</b>		<b>1<sup>th</sup></b>		
<b>Number of Credits</b>		<b>2</b>	<b>Theory</b>	<b>0</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>		<b>2</b>	<b>Health and illness</b>	Speaking :asking about health ,sickness and recovery Reading .Read the passages silently and then aloud listening .listen to the pronunciation of the words in the cassette . Writing and home works :Write an advice about how to keep fit . Gr .The alphabets ,vowels and consonants
<b>2</b>		<b>2</b>	<b>Parts of the body 1</b>	Speaking ;Name the parts of your body .  Reading ;read the passages Grammar: Parts of speech / noun, pronoun, adjective Listening listen to the pronunciations of the given words . Writing : homework assignment
<b>3</b>		<b>2</b>	<b>Parts of the body 2</b>	Speaking:talk about the organs which are in the trunk. Reading ;Read these texts silently Grammar: present simple tense, auxiliary

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				verbs Listening; listen to someone who is talking to a doctor.
<b>4</b>		<b>2</b>	<b>Function of the body</b>	Speaking :Talk about the radiate of pains in the body Reading : read these lines silently Medical English: eating , the five sense Grammar: present simple , aux verb, pronouns Writing ;Write about your family ,
<b>5</b>		<b>2</b>	<b>Medical practitioner</b>	Speaking :Medical English: specialist, choosing a specialty. Grammar: introductory sub/there is / there are Listening ;listen two persons are talking about their friends Home work :Write a short paragraph about doctors
<b>6</b>		<b>2</b>	<b>Nurses</b>	Speaking ;talk about the nurses grades,/ the nurse role Reading :read silently /read aloud Grammar: there is / there are/ plural of nouns. Listening 'listen to these words pronunciation by a native.
<b>7</b>		<b>2</b>	<b>Allied health professionals</b>	Speaking ;talking about technician jobs in the hospital. Reading ;read these lines Listening :listen to this dialog Grammar: countable and uncountable nouns
<b>8</b>		<b>2</b>	<b>Hospitals</b>	Speaking :talk about inpatients and outpatients. Grammar: countable and uncountable nouns Reading :read about a hospital1Listening :listen to the cassette Writing .Homework assignment
<b>9</b>		<b>2</b>	<b>Primary care</b>	Speaking . talk about National Health Service in your country. Reading :read these texts silently Grammar: Modal auxi, (can,will,may) Writing . Home work is given .
<b>10</b>		<b>2</b>	<b>Medical Education</b>	Speaking .talk about medical qualification.

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				Grammar: Modal auxiliary. Reading .read the given text Writing .write a short ph about medical education in your country.
11		2	<b>Medical Education2</b>	Speaking .talking about the different subject which are taught in medical college Grammar: past simple. Writing .write about junior doctors in Afghanistan
12		2	<b>The oversea doctors</b>	Speaking: talk about types of registration. Grammar: past simple, question and negation. Reading .read the given text Writing .write a paragraph about education abroad
13		2	<b>Signs</b>	Speaking .speak about the symptoms and signs of a sickness. Read: read the given passage aloud. Listening :listen to the cassette
14		2	<b>Symptoms</b>	Speaking: talking about symptoms and signs of a patient Grammar: past continuous, interrogative and negation. Listening :listen to these words and repeat after the cassette Writing :write a paragraph about Malaria
15		2	<b>Blood</b>	Speaking .talk about the circulation of blood in the body Reading .read these texts about blood . Grammar: present and past progressive tenses comparing. Writing .write a paragraph about role of blood I the body
16		2	<b>Review</b>	Review: solve the problems of the students/quizzes/test And final examination

Hour per week = 2  
Total credit = 2

**Goal:**

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By the end of this course students should be able to enhance their language skills of speaking, reading, listening and writings and also they will be able to use Medical dictionaries such as Dorland, Oxford etc

### **Course objectives:**

- ✓ To know the Terminology of the Health and illness.
- ✓ To know the Terminology the Parts of the body

### **Skills:**

- ✓ To build up Communications skill.
- ✓ To talk about National Health Service in your country.
- ✓ To talk about inpatients and outpatients.

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Glendinning .H.E. & Howard .R, (2007), *Professional English in use*. Cambridge: Cambridge university press.
2. English grammar by Betty Schampfer , 3<sup>rd</sup> edition
3. Essential grammar in use by Raymond Murphy, 3rd edition, 2007
4. New Inter change book one, by Jack C Richards, students text book, 2008

Information Technology 1

<b>Information Technology 1</b>				
<b>Discipline</b>		<b>Computer</b>		
<b>Department</b>		<b>ICT(Information Communication Technology)</b>		
<b>Course Title</b>		<b>ICDL Module 1 &amp; 3 (Concepts of Information and Communication Technology , Word-processing )</b>		
<b>Course code</b>		<b>ML103</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>1<sup>th</sup></b>		
<b>Semester</b>		<b>1<sup>th</sup></b>		
<b>Number of Credits</b>		<b>2</b>	<b>Theory</b>	<b>0</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>		<b>2</b>	<b>Concepts and Hardware</b>	<b>Concepts:</b> Personal Computer(Laptop & Palmtop Computers, Futures of Handheld Portable digital devices, PDA, Mobile Phones, Media Players, Smart Phones) <b>Parts Of Computer</b> (The CPU, Memory, ROM-BIOS, Disks)
<b>2</b>		<b>2</b>	<b>Input/output ports And Computer Performance</b>	<b>Input/output ports:</b> USB Port, Serial Port, Parallel Port, Network Port, FireWire Port. <b>Computer Performance:</b> Factors affecting performance(CPU Clock Speed, RAM size, Hard disk, Free hard disk space, Fragmentation, De-fragmenting files, Multitasking Considerations, CPU Speeds).
<b>3</b>		<b>2</b>	<b>Memory And Storage</b>	<b>Memory:</b> RAM, ROM, ROM-BIOS, Video (Graphics) Memory,

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				<p>Measurement of storage capacity, Measurement of storage capacity.</p> <p><b>Types of Storage Media:</b> Internal Hard Disk, CDs, DVDs, Recordable CDs and DVDs, USB flash drives, Memory Cards, Network Drives &amp; Online File Storage, Floppy Disks.</p>
4		2	<p><b>Input devices &amp; Output Devices</b></p>	<p><b>Input Devices:</b> Keyboard, Mouse, Scanners, Tracker balls Touch Pads, Joysticks, Webcams Digital Cameras, Microphones.</p> <p><b>Output devices:</b> Traditional Computer Monitors, Flat Screen Computer Screens, Projection Devices, Speakers And Headphones, Printers, Type of Printers, Laser Printers, Inkjet Printers, Dot Matrix Printers Input and Output devices.</p>
5		2	<p><b>Software</b></p>	<p><b>Operating System:</b> Example Of Software Application are: Word Processing Application Spreadsheets Application Databases Application Presentations Application E-mailing Application Web browsers Application Photo editing Application</p>
6		2	<p><b>Software</b></p>	<p><b>Software:</b> Difference between operating systems and application software , Accessibility options Voice recognition Software Screen Reader Software Screen magnifier Software On-Screen Keyboard</p>
7		2	<p><b>Networks And DATA Transfer</b></p>	<p><b>Network:</b> Network Types (LAN, WAN, WAN, Client/server network, Internet, WWW, Intranet, Extranet) <b>DATA Transfer:</b> Downloading from and uploading to a network Broadband versus Dial-up Internet</p>

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				connection services Internet connection Options Features of Internet connection.
<b>8</b>		<b>2</b>	<b>ICT in Everyday Life</b>	<b>ICT in Electronic World</b> <b>ICT in Communication</b> <b>ICT in Virtual Communities</b> <b>ICT in Health</b> <b>ICT in Environment</b>
<b>9</b>		<b>2</b>	<b>Security</b>	<b>Security:</b> Identity and Authentication, Password policies, Off-site backups, Firewalls, Data theft Issues, Viruses, computer Virus (Computer Virus infection Issue, Protecting Against Computer Virus infection, What to do if you discover a virus on your Computer, The limitation of antivirus Software).
<b>10</b>		<b>2</b>	<b>Legal Issue And Site Licenses</b>	<b>Legal Issue :</b> Copyright, Copyright Issue when Copying files. <b>Site Licenses</b> End-user license agreement, Types of software licence agreements, Shareware, Freeware, Open source software, Open source software, Data protection, Data protection and Privacy, Data protection Legislation
<b>11</b>		<b>2</b>	<b>A first look at windows</b>	Starting Windows Viewing your 'computer details' The Start button The Start menu Running a program using the Start menu Shutting down Windows
<b>12</b>		<b>2</b>	<b>The windows desktop</b>	What is the Windows Desktop? Desktop icons Windows Taskbar Taskbar clock Customizing your Desktop Modify the computer date and time Setting the computer keyboard language and other regional settings

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13		2	<b>Files, folders and disks</b>	<p>What are files? What are folders? Types of drive and drive letters Manipulating folders Manipulating files Copying and moving files File compression Online Storage</p>
14		2	<b>The Microsoft Word Screen &amp; Starting To Use Microsoft Word</b>	<p><b>Working with Documents:</b> Starting Microsoft Word The Microsoft word Screen The Office Button, Ribbon Tabs Switching between tabs using the mouse wheel Groups <b>Using the default Microsoft Word document:</b> Saving Microsoft Word Document Saving your file using a different file name Using Help within Microsoft Word Alt key help Saving document using different formats</p>
15		2	<b>Paragraph Formatting</b>	<p><b>Paragraph Formatting :</b> What is paragraph Formatting? Paragraph marks Aligning text Indenting paragraphs</p>
16		2	<b>Page Formatting</b>	<p>What is page formatting? Page Orientation and paper size Changing the page size Page Margins Inserting Page break Header and Footer Page numbering Cover Pages</p>
<p>Hour per week = 2 Total credit = 2</p>				

**Goal:**

On completion of first module, the delegate will understand what is meant by the terms: Hardware, Software, Information networks such as the Internet, Information and Communications Technologies (ICT).

### **Course objectives:**

- ✓ To know the Concepts and Hardware.
- ✓ To know the Input/output ports.
- ✓ To know the Computer Performance
- ✓ To know the Networks And DATA Transfer
- ✓ To know The Microsoft Word Screen & Starting To Use Microsoft Word

### **Skills:**

- ✓ To build up Communications skill.
- ✓ How to do the Memory And Storage.
- ✓ ICT in Electronic World
- ✓ ICT in Communication
- ✓ ICT in Virtual Communities
- ✓ ICT in Health
- ✓ ICT in Environment

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference:**

1. [www.ecdl.org](http://www.ecdl.org)
2. [http://www.ecdl.org/programmes/ecdl\\_icdl](http://www.ecdl.org/programmes/ecdl_icdl)
3. <http://www.ecdl.org/programmes/word-processing>
4. <http://www.ecdl.org/programmes/index.jsp?p=2927&n=2940>

Physics for Health science

Physics for Health science				
Discipline		Basic Science		
Department		PHYSIC		
Course Title		General physic		
Code of Course		ML104		
Course pre requisite		None		
Class		1 <sup>th</sup>		
Semester		1 <sup>th</sup>		
Number of Credits		2	Theory	1
			Practical	1
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	1	1	Balance physical and chemical balance	Sensitivity of balance use and care of the balance
2	1	1	Measurements	mass-volume- specific gravity- units and measurements- properties of matter
3	1	1	Properties of matter	viscosity of both fluids- diffusion and osmosis dynamics- motion- types centripetal force and centrifugal force
4	1	1	Application centrifuge	Application centrifuge principle and parts Applications in medicine preventive maintenance ph meter parts and principle cell counter- basic principle Differential centrifugation,
5	1	1	Basic concept of quantity of heat	Definition and measurement of above concept of temperature thermometry Thermostat, thermocouple relevant to clinical laboratory
6	1	1	Thermal capacity	Thermal capacity specific heat capacity, calorimetric techniques calorific values of food and fuel kinetic theory of gases- assumption

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7	1	1	laws of thermodynamics	Applications laws of thermodynamics water bath- parts, care and usage Incubator-parts, preventive maintenance and use of refrigerators techniques.
8	1	1	Light and optics	While light color spectrum wavelength frequency dispersion reflection refraction critical angle- total internal reflection
9	1	1	Light and optics	While light color spectrum wavelength frequency dispersion reflection refraction critical angle- total internal reflection
10	1	1	Lasers	Lasers- types- focal length- magnification power- spherical and chromatic aberrations- filters- spectrometer- principle and parts- applications microscopes.
11	1	1	Types of microscopes	Types of microscopes- simple- compound- phase contrast- polarizing- fluorescent- dark field- electron microscope- parts and care of the microscope
12	1	1	Sound	Production and propagation- velocity wave length frequency- ultrasound- properties and problems and application in clinical field.
13	1	1	Review of electricity and electronics: Electricity	Determination of power, energy, AC and DC current- resistance- volts,- ohm's law- cycles- earthing- fuse transformers
14	1	1	Electrolytes application in medicine	Types- tum ratio- transformers and stabilizers- uninterrupt power supply (UPS)- electrolysis- basic concept. Electrolytes application in medicine, distillation apparatus parts and principle
15	1	1	Medical electronics	Medical electronics semiconductors- principle of diodes- rectifiers- oscillators- photoelectric emission integrated circuits.
16	1	1	Radioactivity Blood indicator	Basic of radioactivity decay constant decay series- artificial radioactivity- radioisotopes used in medicine Blood indicator (Gamma chamber)- detectors- non chamber- GM count scintillation
<p>1 Lecture = 50 minutes Hour per week = 2 Total credit = 2</p>				

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**Goal:**

Basic concept of quantity of heat: Definition and measurement of above concept of temperature thermometry, Thermostat, thermocouple relevant to clinical laboratory.

**Course objectives:**

- ✓ Understand the fundamentals of physics
- ✓ understand the laws of matter, principles of light and optic and principles of sound, Work mechanism of different lab instruments
- ✓ to understand the radioactivity

**Skills:**

- ✓ To perform Measurements.
- ✓ How to do the Application centrifuge.
- ✓ Electrolytes application in medicine.
- ✓ How to do the Radioactivity Blood indicator.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**References:**

1. Hand book of biomedical instrumentation RSKhandpur;
2. Laboratory instrumentation(Shoef and William).

**Math for Health science**

<b>Math for Health science</b>			
Discipline	Basic Science		
Department	Medical Physics		
Course Title	Mathematics		
Code of Course	ML105		
Course pre requisite	None		
Class	1 <sup>th</sup>		
Semester	1 <sup>th</sup>		
Number of Credits	3	Theory	2
		Practical	1

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Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	1	Numbers and Operation	Real numbers, The set of natural numbers, The rational numbers, Properties of rational numbers, The real numbers systems, The absolute value, The fundamental operations, Roots, Rational exponents, Imaginary numbers. Complex numbers,
2	2	1	Coordinates and Loci	Directed distances, Rectangular Cartesian coordinates, Projections, Distance between two points, Equations and Loci,
3	2	1	Functions and Their Graphs	Constants and Variables, The graph of a function, Graph from Observations,
4	2	1	Linear Function and Their Graph	Rational integral function, Linear functions, Slope of a straight line, The graph of a linear function,
5	2	1	Linear Equations in Two or Three Variable	Rational integral equations, The general linear equation in X and Y, The locus of a given linear equation, The equation of a given straight line, A line parallel to a coordinate axis, Point slope form, Slope intercept form, Two point form,
6	2	1	Linear Equations in Two or Three Variable	Intercept form, The point of intersection of two straight lines, Graphical solution of two simultaneous linear equation, Algebraic solution of simultaneous equation, solution by elimination, Determinants of second order, Solution of simultaneous equation by determinants, Linear equations in three unknowns.
7	2	1	Variation, Ratio, and Proportion	Variation, Joint and inverse variation, Determination of the constant proportionality, Ratio, Proportion.

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8	2	1	Quadratic Equations	The graph of quadratic function, Quadratic equations, graphical solution of quadratic equations, Algebraic solution of quadratic equations, Solution of equation by factoring, Completion of a square, Solution of quadratic equations by Completion of a square, Solution of quadratic equations by formula
9	2	1	Quadratic Equations	Equations in quadratic form, Equations involving radicals, The discrimination of quadratic equations, The sum and product of roots, Factorization of quadratic expression, The formation of quadratic equation with given roots,
10	2	1	Inequalities	Inequalities, Properties of inequities, Absolute and conditional inequalities, Solution of conditional inequalities,
11	2	1	The Locus of an Equation	Introduction, Graphing by Points, Intercepts, Degenerate Loci, Symmetrical points and figures, The extent of a Locus, Horizontal and Vertical Asymptotes, Interception of curve, Discussion of an equation, Loci of equation of the second degree,
12	2	1	Quadratic Equations of Two Unknowns	Quadratic Equations of Two Unknowns, The graphical solution of a system of quadratic equations, Algebraic solution of quadratic system, Systems consisting of one linear and one quadratic equation.
13	2	1	Logarithms	The exponential function, Definition of a logarithm, The fundamental theorems of logarithms, Significant digits and approximations.
14	2	1	Logarithms	Logarithm to the base of 10, Characteristics and mantissa, a table of logarithm, Interpolation.
15	2	1	Limit and diffraction	Theorems of limits, Definition of diffraction.

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16	2	1	Integral	Definitions of integrals, Introduction to integrals.
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1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

**Goal:**

Describes the Numbers and operation, Equations, Logarithm, Limit and Integrals.

**Course objectives:**

- ✓ To Understand the operation on numbers
- ✓ To understand the linear equation in two or three Variables.
- ✓ To understand the Logarithms.
- ✓ To understand the limit and diffraction.
- ✓ To understand Integral.

**Skills:**

- ✓ To perform Operations.
- ✓ How to do some functions and graph.
- ✓ How to do the Logarithmic operations.
- ✓ How to do the limit and Integral operations.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**References:**

- 1-First Year Mathematics for Colleges
- 2-A First Year Colleges Mathematics
- 3-College Algebra

Chemistry

<b>Chemistry</b>				
<b>Discipline</b>		<b>Basic Science</b>		
<b>Department</b>		<b>Chemistry</b>		
<b>Course Title</b>		<b>Organic and nonorganic chemistry</b>		
<b>Course code</b>		<b>ML106</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>1<sup>th</sup></b>		
<b>Semester</b>		<b>1<sup>th</sup></b>		
<b>Number of Credits</b>		<b>3</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>Introduction and description of atom</b>	<b>chemistry, material, composition of material, structure of material chemical characteristics of matter and Physical characteristics of matter ,element. structure of atom ,electron, proton, nucleus of atom, mass of atom, mass of molecule, isotop, isoton and isobar.</b>
<b>2</b>	<b>2</b>	<b>1</b>	<b>Electronic structure of atom</b>	<b>radiation, electro magnetism, micro mechanism, wave mechanism, kouantamy numbers, Orbitals filling, Hound Law , kind of elements</b>
<b>3</b>	<b>2</b>	<b>1</b>	<b>Electronic structure of atom</b>	<b>Geometrical shape of molecule: malecularorbit, sigma ,relation and pie relation</b>
<b>4</b>	<b>2</b>	<b>1</b>	<b>Solution , Gases and liquids</b>	<b>contens of solution. Density of solutions , molar solution, molal solution , normal solution</b>
<b>5</b>	<b>2</b>	<b>1</b>	<b>Gas, Liquid</b>	<b>Gases solvency in liquids Liquid solvency liquids</b>

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6	2	1	Osmotic pressure	osmoses,diffusion,freezing point, boiling points,
7	2	1		Isotonic solution, Hypertonic solution, hypotonic solution
8	2	1	Acid:bases	ampholite, PH quantityas active acid, physiological action ions
9	2	1	Acid – base	Hydrolys,Buffers solution ,PH-buffer of dilution: buffers and density on buffers PH ,
10	2	1	Acid-base	Buffer of organic systems :acidic and basic state of the blood buffer characteristics of amino acid
11	2	1	The first Law of thermodynamic and law number two	free energy of Gibbs entrophy of thermo-chemistry, theory of Hess
12	2	1	Radioactivity	Constant equivalence degree , constant pressure , radio activity elements ortificial radio- activity usage radio –active substance , nuclear process
13	2	1	Classification of organic compounds	Definition ,alkans, nomination of isomers space structure, chemical and physical characteristics of hydrocarbons ,alkans, isomeri alkans and their nomination dines , trans E,Z
14	2	1	Aromatic compounds	: benzene and its components , physica and chemical characteristic of benzene , naphthalinn, Halogens enthracine and their characteristic processe of halogens and multi nuclar compounds SN,S <sub>N</sub> 1,S <sub>N</sub> 2 ,E1,E2
15	2	1	Alcohols	primary, secondary and tertiary alcohols multi valued alcohols, chemical and physical characteristics of alcohols , phenol ,aldehyde eteer tiolsketone and their structures :
16	2	1	Organic amino acids	Obsorbsion adsorbtion organic acid : carbocyclic UV,IR,NMR

**Goal:**

The students should be able to:

- ✓ Explain the electronic structure of atom, geometrical structure of molecules

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- ✓ Units of concentration, osmotic pressure, acid and base and organic compounds.

**COURSE OBJECTIVE:**

- ✓ To know the Introduction and description of atom.
- ✓ To know the Solution, Gases and liquids.
- ✓ To know the Acid: bases.
- ✓ To know the Classification of organic compounds.

**SKILLS**

- ✓ To do the Density of solutions, molar solution, molal solution, normal solution.
- ✓ How to do the alkanes nomination of isomers space structure, chemical and physical characteristics of hydrocarbons, alkanes, isomeric alkanes and their nomination dines, trans E, Z .

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Organic chemistry Morrison-Boyed. Latest edition
2. Analytical chemistry (Skoog- West) latest editon
3. The systematic identification of organic compound. Latest edition

Occupational Health

Occupational Health				
Discipline		Public health		
Department		Environmental and occupational Health		
Subject		Occupational Health		
Course code		ML107		
Prerequisite		None		
Class		1 <sup>th</sup>		
Semester		1 <sup>th</sup>		
Number of Credits		1		
		Lecture	1	
		Practical	0	
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	1	0	Introduction	Orientation and general information about occupational health
	1	0	Generals of occupational health	History and terms of occupational health
2	1	0	General of Occupational health	Definitions, goals and objectives
	1	0	Physical Hazard	Radiations, vibration, Noise, temperature ...
3	1	0	Biological hazards	Microorganisms (bacteria, fungi...) effects
	1	0	Chemical hazards	Chemical agents and some related diseases
4	1	0	Psychological issues	Introduction and basic concepts
5	1	0	Ergonomic hazards	Introduction and basic concepts

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6	1	0	Occupational health in health workers	Hazard factors in hospital environment
7	1	0	Occupational health in health workers	Standard precautions in health workers
	1	0	Environmental health	General information, definitions and classification of Environmental health
8	1	0	Air pollution	definition, classifications, sources, effects of air pollution
9	1	0	Food	Food borne diseases and causes, care of foods
10	1	0	Water	Clear water, classification of water, waterborne diseases, water purification process
	1	0	Liquid and solid waste	Definitions and classifications
11	1	0	Review of lectures	Review of lectures of the semester and discussion
12	1	0	Introduction	Orientation and general information about occupational health
13	1	0	Generals of occupational health	History and terms of occupational health
14	1	0	General of Occupational health	Definitions, goals and objectives
15	1	0	Physical Hazard	Radiations, vibration, Noise, temperature ...
16	1	0	Biological hazards	Microorganisms (bacteria, fungi...) effects
<p>1 Lecture = 50 minutes Hour per week = 1 Total credit = 1</p>				

## GOAL

Through successful completion of this program, students will acquire the knowledge, skills, and judgment to function as an entry-level practitioner in occupational health and safety. Students will be able to contribute to the development and maintenance of a healthy and safe work environment

## COURSE OBJECTIVE:

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This course introduces students to physical, chemical and biological hazards found in the environment and health risks associated with workplace and community exposure to them. Risks to special populations and mechanisms of recognize and reducing or controlling these risks are discussed.

### **SKILLS**

After completion of this course students will be able to:

- ✓ Recognize potential environmental and occupational risks from environmental hazards and solicit ways to mitigate the risk;
- ✓ Measure and evaluate accident prevention performance and compare performance against national performance;
- ✓ Describe factors that affect population susceptibility to adverse health outcomes following exposure to environmental hazards;
- ✓ Discuss community sensitivity to issues of environmental justice and equity;
- ✓ Recognize potential responses to selected environmental exposures;
- ✓ Perform basic accident investigation;
- ✓ Conduct safety and health inspection;
- ✓ Propose approaches to assess environmental insult;
- ✓ Design basic record keeping system for tracking safety and health;
- ✓ Describe federal legislation that limits exposure in order to control environmental health issues.

### **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Clinical Immunology & Serology, a Laboratory Perspective, by Christine Dorresteyn Stevens, 3rd edition. F.A. Davis, Copyright 2009. ISBN 978-0-8036-1814-5
2. Medical microbiology, 25<sup>th</sup> edition : Jawetz, Melnick & Adelberg's
3. Kuby immunology, 7<sup>th</sup> ed. ISBN-13:978-14292-1919-8

**Fundamentals of medical laboratory technology**

<b>Fundamentals of medical laboratory technology</b>				
<b>Discipline</b>		<b>Medical Laboratory Technology</b>		
<b>Department</b>		<b>Medical Technology</b>		
<b>Course Title</b>		<b>Fundamentals of MLT</b>		
<b>Course code</b>		<b>ML108</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>1<sup>th</sup></b>		
<b>Semester</b>		<b>1<sup>th</sup></b>		
<b>Credits</b>		<b>3</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>History of Medical Laboratory Technology (MLT)</b>	Defination of laboratoar Defination of medical laboratoar Significance of medical laboratory in medical field Classification of medical laboratory
			<b>Basics of Medical Laboratory equipments and instruments</b>	Glass and other usable equipment in a medical laboratory Glass ware
<b>2</b>	<b>2</b>	<b>1</b>	<b>Plastic Ware</b>	Polyolefins Polycarbonate Flurocarbone or teflon Basic problems of plastic ware Cleaning of glass & plastic ware
			<b>Quality control cleaning of glass &amp; plastic ware</b>	Cleaning solution Sulfochromic acid preparation Chlorin Nitric acid concentrated
<b>3</b>	<b>2</b>	<b>1</b>	<b>Introduction of Medical Laboratory instruments and equipments</b>	Microscopic slide Cover slide Tubes, centrifuge tube, round base tubes,

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				flate base tubes Racks and trays Baskets Trays, collecting tray, slide box
			<b>Liquid measuring items</b>	Different kinds of pipettes
<b>4</b>	<b>2</b>	<b>1</b>	<b>Micropipete</b>	Different kinds of micropipete Uses of micropipete and skills of pipetting
			<b>Measuring equipment</b>	Measuring cylinder Burette Measuring jug Volumetric flask Erlen meyer Vaccum flask Beaker Round flask
<b>5</b>	<b>2</b>	<b>1</b>	<b>Staining equipment ESR equipment</b>	Coplin jar Slide staining trough Wash bottle ESR stand ESR pipettes ESR blood container
<b>6</b>	<b>2</b>	<b>1</b>	<b>Specimen containers</b>	Urine container Fecal container Sputum container Blood container Calibrated capillaries Hematocrit capillaries
			<b>Reagent and media containers or bottles</b>	Brown or other opaque container Clear or translucent container Dropper bottle Bijoj bottle Universal bottle Screw bottle
<b>7</b>	<b>2</b>	<b>1</b>	<b>Transporting specimen Blood collection item</b>	Slide mailer Cool box Tourniquet Pressure cuff Spencer walls forceps Syringes Needles

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				Lancetes Blood donor bags Blood collection card
8	2	1	<b>Swabs</b> <b>Urinometer</b> <b>Gloves</b>	Applicator sticks Ready made swab Transport swabs
			<b>Detergent</b> <b>Dressing</b>	Detergent Disinfectant Hand soap Timer, stopwatch Cotton wool Cellulos wadding Elastoplast tape Elastoplast dressing Scissors
9	2	1	<b>Some usable stationery</b>	lable for specimens lable for reagent container hazard lables filter paper record books graph paper
			<b>Counting chamber</b>	Different kinds of counting chamber
10	2	1	<b>differential cell counter</b> <b>hemoglobinometer</b> <b>albuminometer</b>	uses of cell counter sahli hemoglobinometer Esbach albuminometer
			<b>Microscopoes</b>	History Different parts of microscopoe Uses of microscope Maintenance of microscopoe
11	2	1	<b>Different kinds of microscope</b>	Optical microscope Compound microscopoe Dark field microscope Polarized microscope
				Phase contrast microscope Flurescence microscopoe Electrone microscope
12	2	1	<b>Centrifuge and kinds of centrifuge</b>	Parts of centrifuge Hand driven centrifuge Electric centrifuge

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			<b>Hematocrit centrifuge</b>	Uses of hematocrite centrifuge Determination of Hct
<b>13</b>	<b>2</b>	<b>1</b>	<b>Medical balance</b>	Kinds of medical balance Uses of balance Maintenance
			<b>Incubator</b>	Uses of incubator Maintenance of incubator Uses of anaerobic jar and candle Water bath
<b>14</b>	<b>2</b>	<b>1</b>	<b>Usable Instruments for sterility and control of microorganism</b>	Autoclave Dry oven
			<b>Safety cabinet (Hood)</b>	Safety cabinet or hood
<b>15</b>	<b>2</b>	<b>1</b>	<b>Usable instruments in histopathology laboratory Mixer</b>	Microtome Autotechnican Slide warmer Mixer
			<b>PH meter &amp; PH paper Distilled water and distilled water analyzer Refrigerator and freezer</b>	What's PH Uses of PH meter distilled water and distilled water analyzer Method of distillation Method of Ion exchange Method of reverse osmosis Distillation Refrigerator Freezer
<b>16</b>	<b>2</b>	<b>1</b>	<b>Auto analyzer in medical laboratory</b>	Spectrophotometer & colorimeter Microlabe (Biochemical Analyzer)
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

**GOAL:**

- ✓ To Understand the principles of different equipment used in laboratory
- ✓ Use the different equipment of laboratory.

**Course objectives:**

- ✓ To know the Basics of Medical Laboratory equipment and instruments.
- ✓ To know the Medical Laboratory instruments and equipment.
- ✓ To know the Specimen containers

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- ✓ To know the Centrifuge and kinds of centrifuge.

**Skills:**

- ✓ How to use different lab instruments.
- ✓ How to use microscopes.
- ✓ How to use the centrifuge.
- ✓ How to use sample containers.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Maintenance Manual for Laboratory Equipment
2. Laboratory safety manual
3. Laboratory biosafety manual
4. Lubert Stryer Biochemistry (last edition)



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First Year: Second semester

Islamic Studies 2

<b>Islamic Studies 2</b>				
<b>Discipline</b>			Religious	
<b>Department</b>			Islamic Studies	
<b>Course Title</b>			Faith	
<b>Course code</b>			ML201	
<b>Prerequisite</b>			Islamic Studies 1	
<b>Academic year</b>			1	
<b>Semester</b>			2	
<b>Number of Credits</b>		1		
		<b>Theory</b>		1
		<b>Practical</b>		0
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	1			Faith : General Information regarding Tawheed
2	1			Faith: Types of Tawheed, Pillars of Tawheed.
3	1			Faith: Conditions of Tawheed, advantages of Tawheed.
4	1			Faith: General information about Sherk
5	1			Faith: Types of Sherk
6	1			Faith: Islamic Rules for Sherk and Mushrek
7	1			Faith: Tawasul (To solicit)
8	1			Faith: belief in Qaza and Qadar, Allah's prophets, books, angels and day of Judgements.
9	1			Tajweed
10	1			Tajweed
11	1			Tajweed
12	1			Memorization and translation of Surah 85 – 94

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<b>13</b>	<b>1</b>			<b>Memorization and translation of Surah 85 – 94</b>
<b>14</b>	<b>1</b>			<b>Memorization and translation of Surah 85 – 94</b>
<b>15</b>	<b>1</b>			<b>Special Duaa (prayers) accordig to Hadith and Sunnah</b>
<b>16</b>	<b>1</b>			<b>Special Duaa (prayers) accordig to Hadith and Sunnah</b>

1 Lecture = 50 minutes  
Hour per week = 1  
Total credit = 1

### **Goal**

To explain basic information about Islamic studies and to understand of the students regarding Islamic civilization

### **Course objectives:**

- ✓ To know the Faith.
- ✓ To do Memorization and translation of Surah 85 – 94.
- ✓ To know the Special Duaa (prayers) accordig to Hadith and Sunnah.

### **Skills:**

- ✓ To build up Communications skill.
- ✓ How to memorize surah.

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **✓ Refrences**

1. Quran
2. Hadis

Foreign Language & Medical Terminology 2

Foreign Language & Medical Terminology 2				
Discipline		English language		
Department		English department		
Subject		ESP/Professional English & General English		
Course code		ML202		
Prerequisite		Foreign Language & Medical Terminology 2		
Class		FIRST YEAR		
Semester		Second		
Number of Credits		2	Theory	0
			Practical	2
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1		2	How are Illnesses and Infection Spread?	Speaking; students identify how illnesses are spread by reading a text and summarize the text orally in three minutes. Listening; listen to new words pronunciation and identify their meaning. <b>Grammar:</b> present continuous ,/ verb /transitive intransitive verbs
2		2	Bones	<b>Looks</b> .Talking about similarities between family member <b>Bones :fracture s/treatment of bone</b> <b>Grammar:</b> present continuous , auxiliary verb /main verb. <b>Reality;</b> talking about dreams and reality <b>Childhood: milestone /coeliac disease</b> <b>Grammar;</b> :future form , would like , reading ,
3		2		
4		2	The endocrine system	<b>Reality;</b> talking about dreams and reality <b>The endocrine system</b> :goiter/ a referral letter of a patient <b>Grammar;</b> :future form , would like , regular and irregular verbs
5	2	2	The eye	<b>Things</b> . talking about lost property . <b>The eye</b> :examination of the eye, retinopathy

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				Grammar; comparative and superlative adj .
6		2	The gastrointestinal system	Things . talking about lost property The gastrointestinal system /abdominal quadrants Grammar; comparative and superlative adj .
7		2	Gynecology	Energy ; talking about daily activities , Gynecology ; menstruation Grammar ; Adv of frequency , How often Energy ; talking about daily activities , The heart and circulation Grammar ; Frequency expression , How often
8		2		
9		2	The heart and circulation part 2	Dotcom . : talking about website The heart and circulation part 2 Grammar. Present perfect .tense / have and has as auxiliary verb
10		2	Infections	Dotcom . : talking about website Infections :fever , source of infection Grammar. Present perfect . question and negative sentences
11		2	Mental illness	Drive ; talking about drives to work Mental illness :neurotic disorders Grammar. Question form , WHAT+NOUN ,
12		2	The nervous system	Drive ; talking about drives to work The nervous system Grammar. Question form , WHAT+NOUN ,
13		2	The nervous system 2	Justice :talking about revenge ,writing a story , The nervous system 2 Grammar :Punctuation ,past con ,
14		2	Oncology	Speaking: talking about neoplasms Reading: read the text on sign and symptom of malignancy Writing: how to treat a tumor by the information the text.
15		2	Pregnancy	Extreme :talking about nature Pregnancy and childbirth / labor presentation and lie Grammar :Active voice and passive voice

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16		2	Review	Review. troubleshooting quizze
Hour per week = 2 Total credit = 2				

**Goal:**

At the end of the second semester the students will be able to translate from their native language to English and from English to Dari or Pashto .Our focus in the second semester is to stress on medical English or ESP

**Course objectives:**

- ✓ To know the terminology How are Illnesses and Infection Spread?
- ✓ To know the terminology of The different systems.
- ✓ To know the terminology The oncology.

**Skills:**

- ✓ To build up Communications skill.
- ✓ Can talk about different human systems in English.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Glendinning .H.E. & Howard .R, (2007), Professional English in use. Cambridge: Cambridge university press
2. English grammar by Betty Schampfer , 3rd edition
3. Essential grammar in use by Roymound Murphy, 3rd edition, 2007
4. New Inter change book one, by Jack C Richards, students text book, 2008

Information Technology 2

Information Technology 2				
Discipline		Computer		
Department		ICT(Information Communication Technology)		
Course Title		ICDL Module 4 & 6 (Spread Sheet, Presentation)		
Course code		ML203		
Prerequisite		Information Technology 2		
Class		1		
Semester		2 <sup>th</sup>		
Number of Credits		2	Theory	0
			Practical	2
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1		2	A First look at excel	Starting the excel program What is active cell The excel referencing system Entering numbers and text Default text and number alignment Summing a column of numbers Entering a date Worksheets and workbooks Selection techniques
2		2	Manipulating Rows and Columns Manipulating Cells and Cell contents	<b>Manipulating Rows and Columns:</b> Inserting rows and columns into a worksheet Deleting rows and columns within a worksheet Modifying columns widths and heights Automatically resizing the column width to fit contents <b>Manipulating Cells and Cell contents:</b> Copying a cell or range contents within a workbook Deleting cell contents Editing cell content AutoFill

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				<p>Copying a data range using AutoFill Sorting a cell range</p>
<b>3</b>		<b>2</b>	<p><b>Worksheets Formatting Freezing Row and Column Titles</b></p>	<p><b>Worksheets:</b> Switching between worksheets Renaming, inserting, Deleting, Copying, Moving a worksheet <b>Formatting:</b> Alignment Formatting (Aligning Contents in a cell range, Centering a title over a cell range, Cell Orientation, Text wrapping) Number formatting (decimal point display, currency symbol, date styles, percentages) <b>Freezing:</b> Freezing row and column titles</p>
<b>4</b>		<b>2</b>	<b>Formula</b>	<p><b>Formula:</b> Creating formulas Copying formulas Operators Using operator in formulas Formula error messages</p>
<b>5</b>		<b>2</b>	<b>Functions</b>	<p><b>What is a function</b> Common functions (Sum, Average, Max, Min, Count, CountA, CountBlank, Round and If functions )</p>
<b>6</b>		<b>2</b>	<b>Charts</b>	<p><b>Charts:</b> Inserting( column chart, line chart, bar chart, pie chart) Resizing a chart ) Deleting a chart Chart title or labels</p>
<b>7</b>		<b>2</b>	<b>Charts</b>	<p><b>Charts:</b> Changing the chart background color Changing the column, bar, line or pie slice colors in chart Modifying the legend fill color Changing the chart type Modifying charts using the layout tab Copying and moving charts within a worksheet Copying and moving charts between worksheets and workbooks</p>

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8		2	<b>Printing</b>	<p><b>Printing:</b> Worksheet setup(Worksheet margins, Worksheet Orientation, Worksheet page size , Header And Footers)</p>
9		2	<b>Preparing to Print A Worksheet</b>	<p><b>Preparing to Print A Worksheet:</b> Visually check your calculations, Displaying gridlines when printing, Printing titles on every page when printing printing the excel row and column headings Spell checking Previewing a worksheet Comparing workbooks side by side Zooming the view printing options</p>
10		2	<b>Opening and Viewing Presentations</b>	<p><b>Opening and Viewing:</b> First Steps With Presentations Creating a Presentation (Manipulating Slides, Themes: Text editing and formatting)</p>
11		2	<b>Tables</b>	<p><b>Tables:</b> Table selection techniques Creating a table Apply style to a table Apply border to cells Inserting , Deleting &amp; Modifying rows or columns</p>
12		2	<b>Illustrations</b>	<p><b>Formatting Shapes:</b> (Grouping and ungrouping objects, Rotating or flipping an illustration) Formation charts : (Changing the chart type, Adding data table to chart ) Organization charts: (what is an organize chart, creating an organize chart, Adding a manager whiten an organization chart)</p>
13		2	<b>Organization Charts Moving, Copying and Deleting Slides</b>	<p><b>Organization Charts:</b> What is an organization Chart? Creating an organization chart Adding label to items within organization chart Adding a co-Worker to an organization chart</p>

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				<p>Adding a manager within an organization chart</p> <p>Changing the hierarchical structure of an organization chart</p> <p><b>Moving, Copying and Deleting Slides:</b></p> <p>Moving slides within a presentation or between presentations</p> <p>Copying slides between presentations</p>
14	2	<b>Slide Masters</b>		<p><b>Slide Masters:</b></p> <p>What is slide master</p> <p>Inserting a picture (clip art) into a master slide</p> <p>Inserting an image (form a file ) into a master slide</p> <p>Creating a footer</p> <p>Automatic slide numbering</p>
15	2	<b>Slide Shows &amp; Printing And Proofing</b>		<p><b>Slide Shows:</b></p> <p>Running a slide show</p> <p>Slide show transition effects</p> <p>Slide Show animation effects</p> <p><b>Printing And Proofing:</b></p> <p>Spell-checking</p> <p>Selecting your output format</p> <p>Printing a presentation</p>
16	2	<b>Customizing &amp; Compatibility Issues</b>		<p><b>Customizing &amp; Compatibility Issues:</b></p> <p>Modifying power point options</p> <p>Compatibility issues when saving a presentation</p> <p>Other file types you can use for saving a presentation</p> <p>Saving a presentation as a template</p>
<p>Hour per week = 2 Total credit = 2</p>				

**Goal:**

On completion of the modules, the delegate will understand the skills of spread sheet and presentations.

**Course objectives:**

- ✓ To know the excel.
- ✓ To know the Opening and Viewing Presentations.

**Skill:**

- ✓ To build up Communications skill.
- ✓ How to use the excel program.

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- ✓ How to use presentation and PowerPoint program.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. [www.ecdl.org](http://www.ecdl.org)
2. <http://www.ecdl.org/index.jsp>
3. <http://www.ecdl.org/programmes/index.jsp?p=2927&n=2941#sthash.vVAKY0tN.dpuf>
4. <http://www.ecdl.org/programmes/index.jsp?p=2928&n=2942#sthash.ZWvGphxk.dpuf>

**First AID**

<b>First AID</b>				
Discipline		Medical allied health		
Department		Surgery		
Subject		First aid		
Course code		ML209		
Prerequisite		Occupational Health		
Class		1		
Semester		2		
Number of Credits		<b>2</b>	Theory	<b>1</b>
			Practical	<b>1</b>
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
<b>1</b>	1	1	First aid	Introduction Definition of first aid Responsibilities of first aid Philosophy of first aid Health and safety <ul style="list-style-type: none"> <li>• Exposure to biological Hazards</li> <li>• Universal precautions                             <ul style="list-style-type: none"> <li>- Exposure sources</li> <li>- Exposure routes</li> </ul> </li> <li>• Immediate action at scene following exposure                             <ul style="list-style-type: none"> <li>- For an open wound</li> <li>- For a splash to a mucous membrane</li> <li>- For a splash to the skin</li> </ul> </li> </ul> Priorities General principles of first aid General assessment of the situation

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2	1	1	Fundamental criteria for first aid	Understanding vital body functions for first aid Adverse conditions Basics of first aid Evaluating a casualty
3&4	2	2	<b>Basic Clinical Procedures</b>	Introduction General principles Needle thoracocentesis Urinary catheterization Vein puncture( subclavian catheterization) Arterial puncture Venous cut down wound suturing techniques opening of airway(simple manor, respiration by mask, Endotracheal intubation, Cricothyroidotomy, Nasogastric tubes

5&6	2	2	Casualty assessment	<p><b>The primary survey</b>          DRS ABCD{Danger: (Moving a casualty.)          Response:(overview, causes of unconsciousness, How to check for responsiveness, four level of responsiveness)          Send for help: (Activating the Emergency Medical services)          Airway:(overview, airway obstruction, suffocation, strangulation, choking, how to check an airway)          Breathing:( causes of absent or ineffective breathing, Signs of ineffective breathing, How to check for breathing, rescue breaths, Mouth to mouth , Mouth to mouth Ventilation: Bag valve mask Laryngeal mask, Endotracheal intubation, Cricothyroidotomy,)          Cardiopulmonary Resuscitation:Air way opening ,Chest compressions ,Rescue breathing,          Disability}  <b>Casualty position</b>          Stable side position          Foreign Body Airway obstruction (Choking)          Airway obstruction(partial, complete, signs and symptoms, treatment: conscious victim,unconscious victim.          The secondary survey: secondary assessment procedure, Managing a responsive casualty, vital signs</p>

7&8	2	2	Stop the Bleeding	<p><b>. General</b> Clothing methods of temporary, homeostasis, elevation, bandage application, direct pressure, bent the joint <b>Tourniquet application</b>, methods, indications, inconvenient, mistake ,application, clamping the bleeding vessels, Spical types of external bleeding</p> <ul style="list-style-type: none"> <li>- From an open fracture</li> <li>- From a tooth socket</li> <li>- From the earpassage</li> <li>- From the nose</li> <li>- From the lips, cheak and tongue</li> </ul> <p>Internal bleeding <b>Check for Shock</b> <b>Signs and Symptoms of hemorrhagic Shock .</b> <b>First Aid Measures for hemorrhagic Shock</b> Hypovolemic shock Definition, signs and symptoms,classification of severity of hypovolemic shock treatment Distribotive shock Definition, Septic shock, lab/physical findings, treatment Anaphylactic shock: physical findings ,treatment Neurologic shock: cause ,treatment Cardiogenic shock:definition, findings,treatment</p>
9&10	2	2	Dressings, Bandages , Slings and Splint	<p>Standard dressing Bandage: Bandages; rules, fixing the end of bandage: type of bandage Tube gauze finger bandage, Triangular bandage, Broad and narrow fold bandage, Hand bandage, Wrist and palm bandage, Elbow bandage, Shoulder bandage, crutch bandage, Hip bandage, Knee bandage, Foot bandage, Eye bandage, Head and scalp bandage, Ring pad. Slings: large arm sling, collar and cuff sling, triangular sling, improvised sling and supports Splints:</p>

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10&11	2	1	First aid for fractures	<p>General Types of Fractures Signs and Symptoms of Fractures Management Principles of treatment Examination General treatment . Collarbone, Shoulder blade and shoulder upper arm, elbow, forearm and wrist, Hand fingers, crush injury to the hand, Hipe to knee, Kneecap, Knee to foot, lower limb, Ankle, Heel bone, Bones of the foot, Both legs, Jaw, spine, Neck, Pelvis <b>Dislocation.</b> <b>Soft tissue injury</b> Overview Treatment –RICED Signs and symptoms management</p>
11	1	1	First aid in genitourinary system	<p>Introduction Hematuria Acute swelling in scrotal content Testicular torsions Urinary system stones trauma</p>
12	1	1	FIRST AID FOR SPECIFIC INJURIES	<p>General First Aid for Head, Neck, and Facial Injuries First Aid for Chest Wounds First Aid for Abdominal Wounds First aid for Burn Injuries Heat Injuries Cold Injuries Chemical burn Eye injury, loose foreign body Ear injuries ,foreign body Nose injury, forign bodies Spinal injury</p>

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13	1	1	FIRST AID FOR BITES AND STINGS	General Types of Snakes Snakebites Human or Animal Bites Insect Bites and Stings . First Aid for Bites and sting
14	1	1	Rescue and transportation procedures	General Principles of rescue operations Considerations Plan of action Proper Handling of casualties Positioning the casualty Medical evacuation and transportation of casualties Manual carries Improvised Litters
15	1	1	The Hand	Introduction Infection of the hand: felon, nail infection, tenosynovitis Gamekeeper's Thumbs Carpal tunnel syndrome Mallet finger Trigger finger

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15& 16	2	2	Fluid and electrolytes	<p>Introduction</p> <p>Volume deficit(dehydration): causes, signs and symptoms, treatment,</p> <p>Volume excess:</p> <p>Isotonic ,hypotonic, hypertonic: causes, signs and symptoms, treatment,</p> <p>Ongoing fluid loss</p> <p>Assessing hydration status</p> <p>Sodium balance : hyponatremia : causes, signs and symptoms, treatment,,hypernatremia,: causes, signs and symptoms, treatment,</p> <p>Potassium balance: hypokalemia,: causes, signs and symptoms, treatment,</p> <p>hyperkalemia: causes, signs and symptoms, treatment,</p> <p>calcium balance: hypocalcemia : causes, signs and symptoms, treatment,</p> <p>hypercalcemia: causes, signs and symptoms, treatment,</p>
<p>1 Lecture = 50 minutes Hour per week = 2 Total credit = 2</p>				

**Goal:**

Know the basic clinical procedures and causal assessment,  
To apply the knowledge of stopping bleeding, fracture treatment and bits and stings in practice.

**Course objectives:**

- ✓ To know the Fundamental criteria for first aid.
- ✓ To know the Basic Clinical Procedures.
- ✓ To know the Rescue and transportation procedures.
- ✓ To know the Fluid and electrolytes.

**Skills:**

- ✓ How to do Needle thoracocentesis.
- ✓ How to do Urinary catheterization.
- ✓ How to do the Vein puncture( subclavian catheterization).
- ✓ How to do the Arterial puncture and Venous cut down.
- ✓ wound suturing techniques

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion

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- ✓ PBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**REFERENCES:**

1. The prikle of care in first aid manual 15 2015 newziland first aid manual.
2. New century first aid 5<sup>th</sup> edition 2005.

General Histology

<b>General Histology</b>					
<b>Discipline</b>		Para clinic			
<b>Department</b>		Histology			
<b>Course Title</b>		General Histology			
<b>Course code</b>		ML210			
<b>Prerequisite</b>		Cell Biology			
<b>Class</b>		1 <sup>st</sup>			
<b>Semester</b>		2 <sup>nd</sup>			
<b>Discipline</b>		Para clinic			
<b>Number of Credits</b>		<b>3</b>		<b>Lecture</b>	<b>2</b>
				<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>2</b>	<b>1</b>	<b>Definition and methods</b>	Cytology, General histology, Systemic histology, Tissue preparation, Sectioning methods, Smear methods, Special methods, Microscopy	
<b>2</b>	<b>2</b>	<b>1</b>	<b>Components of the body</b>	Cells, Intercellular substances, Tissue Fluid	
<b>3</b>	<b>2</b>	<b>1</b>	<b>Cells structure</b>	Cytoplasm, Nucleus, Cell cycle, Cell adhesions	
<b>4</b>	<b>2</b>	<b>1</b>	<b>Epithelium and Glands</b>	Epithelial membranes, Modification of the epithelium, Classification, Functions, Exocrine glands, Endocrine glands, Clinical considerations	
<b>5</b>	<b>2</b>	<b>1</b>	<b>Connective Tissue</b>	Classification, Extracellular Matrix, Connective tissue fibers, Amorphous ground substances, Connective tissue cells	
<b>6</b>	<b>2</b>	<b>1</b>	<b>Connective tissue</b>	Proper connective tissue, Special connective tissue, Clinical considerations	

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7	2	1	<b>Cartilage</b>	Perichondrium, Growth of cartilage, Nutrition, Degeneration, Kinds of cartilage
8	2	1	<b>Bone</b>	Bone cells, Intercellular substances, Periosteum, Endosteum
9	2	1	<b>Bone</b>	Osteogenesis, Bone growth, Nutrition, Clinical considerations
10	2	1	<b>Blood and Hemopoisis</b>	Formed elements of the blood, Erythrocytes, Leukocytes, Platelets, Plasma
11	2	1	<b>Blood and Hemopoisis</b>	Hemopoiesis, Erythrocytic series, Granulocytic series, Monocytic series, Lymphocytic series, Thrombocytic series, Clinical considerations
12	2	1	<b>Muscles</b>	Skeletal muscles, Microscopic structure, Types of muscle, Fibers, Innervations, Muscle contraction
13	2	1	<b>Muscles</b>	Cardiac muscle, Smooth muscle, Clinical considerations
14	2	1	<b>Nervous Tissue</b>	Nerves and supporting cells, Cells body, Cell processes, Types of neuron
15	2	1	<b>Nervous tissue</b>	Neuroglia, Blood Brain Barrier, Nerve endings, Synapse, Sensory nerve endings, Motor nerve endings, Histophysiology of the nerve cells
16	2	1	<b>Nervous system</b>	Structure, Spinal cord, Cerebellum, Cerebrum, Choroid plexus, Dorsal root ganglion, Peripheral nerve, Clinical considerations
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## **GOAL**

The goals of the course are three-fold:

- 1) To provide a foundation of the fundamental concepts of the microscopic anatomy of the human body;
- 2) To develop an understanding how organ integrity and functions are maintained by the organization of cells and tissues;
- 3) To promote critical thinking of the clinical consequences of cellular disorders and tissue-related diseases, intracellular pathogens, cancer and etc.

## **COURSE OBJECTIVE**

General histology will cover the microscopic structure and function of human cells and tissues that make up the organ systems. The organization of cells and tissues are correlated

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with diagnostic imaging (e.g., electron microscopy and immunohistochemistry) of normal and pathologic tissues. Clinical exercises will be used to develop “problem solving” and “critical thinking” skills.

### **SKILLS**

Upon completion of this course, students will be able to:

- ✓ Define all the histological terms;
- ✓ How to use microscope in histology laboratory;
- ✓ Demonstrate and understanding of the microscopic organization and relationships of cells, tissues and organs of the human body;
- ✓ Identify various cells and tissues and describe their functions;
- ✓ develop problem solving skills to evaluate both normal and pathologic structure and function of cells and tissues that comprise the organs of the human body; and
- ✓ Demonstrate critical thinking skills to describe possible pathologic outcomes of dysfunctional cells and tissues.

### **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Atlas of histology with functional correlation. Di Fiore’s international edition.

Biostatistics

<b>BASIC BIOSTATISTICS</b>				
<b>Discipline</b>		<b>Public Health</b>		
<b>Department</b>		<b>Epidemiology and Biostatistics</b>		
<b>Course Title</b>		<b>Basic Biostatistics</b>		
<b>Course code</b>		<b>ML211</b>		
<b>Prerequisite</b>		<b>Math</b>		
<b>Class</b>		<b>First class</b>		
<b>Semester</b>		<b>2<sup>nd</sup> semester</b>		
<b>Number of Credits</b>		<b>2</b>		
		<b>Theory</b>	<b>1</b>	
		<b>Practical</b>	<b>1</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>1</b>	<b>1</b>	Introduction to Biostatistics	What is biostatistics? Type of statistics and its usage, parameter and statistics
<b>2</b>	<b>1</b>	<b>1</b>	Measurement	Organizing data, type of measurements, data quality, and exercise
<b>3</b>	<b>1</b>	<b>1</b>	Frequency Distribution and graphs	Frequency tables, class-interval frequency table, type of graph, bar graph, stacked graph, pie chart, histogram and other type of graph
<b>4</b>	<b>1</b>	<b>1</b>	Summary statistics: central location	Mean, mode, median and their comparison; range; quartiles, 5 points summary and interquartile range; and boxplot
<b>5</b>	<b>1</b>	<b>1</b>	Summary statistics: dispersion	Variance and standard deviation (SD), coefficient of variation, facts about SD, and selecting summary statistics
<b>6</b>	<b>1</b>	<b>1</b>	Standardization	Z score and T score, usage of standardized score
<b>7</b>	<b>1</b>	<b>1</b>	Normal probabilities distribution	Normal distribution: A Heuristic example, characteristics of normal distributions, the

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				68-95-99.7 rule, and Determining normal probabilities: standardizing values, the standard normal table, probabilities for ranges of normal random variables,
<b>8</b>	<b>1</b>	<b>1</b>	Normal probabilities distribution	Finding values that correspond to normal probabilities: terminology and notation, and assessing departures from normality
<b>9</b>	<b>1</b>	<b>1</b>	Sampling distribution	Distribution of sampling mean, standard error concepts, central limit theorem
<b>10</b>	<b>1</b>	<b>1</b>	Basic of confidence intervals	Introduction to estimation, confidence level for $\mu$ when $\delta$ is unknown, factors affecting confidence interval
<b>11</b>	<b>1</b>	<b>1</b>	Basics of Hypotheses testing	The null and alternative hypotheses, test statistics, p-value, significance level, type I and type II error
<b>12</b>	<b>1</b>	<b>1</b>	Comparing of independent proportion	Chi square test, contingency table, condition of usage and practice
<b>13</b>	<b>1</b>	<b>1</b>	One sample test and Comparing independent mean	One sample t test and conditions of usage, practice, Independent t test and conditions for usage, practice
<b>14</b>	<b>1</b>	<b>1</b>	Comparing dependent mean	paired t test and conditions of usage, practice
<b>15</b>	<b>1</b>	<b>1</b>	Comparing Several Means (One-Way Analysis for Variance)	Analysis of Variance (ANOVA), Post Hoc comparison, conditions of usage, practice
<b>16</b>	<b>1</b>	<b>1</b>	None parametric test	Mann Whitney U test, Wilcoxon test, kruskalwallis

1 Lecture = 50 minutes  
Hour per week = 2  
Total credit = 2

**Goal:**

To know the Introduction to Biostatistics and the Measurement parameters

**Course objectives:**

- ✓ To know the Introduction to Biostatistics.
- ✓ To know the Measurement parameters

**Skills:**

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- ✓ To know Frequency Distribution and graphs.
- ✓ How to do Sampling distribution.
- ✓ How to do Basic of confidence intervals.
- ✓ How to do Basics of Hypotheses testing.
- ✓ How to do One sample test and Comparing independent mean.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**References:**

- 1- Gerstman, B. B. (n.d.). Basic Biostatistics: Statistics for Public Health Practices. Sudbury: Jones and Bartlet Publisher.

Human Anatomy

<b>HUMAN ANATOMY</b>					
<b>Discipline</b>		<b>Para clinic</b>			
<b>Department</b>		<b>Anatomy</b>			
<b>Course Title</b>		<b>Human Anatomy</b>			
<b>Course code</b>		<b>ML212</b>			
<b>Prerequisite</b>		<b>None</b>			
<b>Class</b>		<b>1<sup>st</sup></b>			
<b>Semester</b>		<b>2<sup>nd</sup></b>			
<b>Discipline</b>		<b>Para clinic</b>			
<b>Number of Credits</b>		<b>3</b>		<b>Lecture</b>	<b>2</b>
				<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>2</b>	<b>1</b>	<b>Basic Anatomy Basic structures</b>	Definition, descriptive anatomical terms, skin, fascia, muscles, joints, ligaments, blood vessels, bones, cartilages	
<b>2</b>	<b>2</b>	<b>1</b>	<b>Human osteology</b>	Bones of the upper limb Bones of the lower limb Vertebral column	
<b>3</b>	<b>2</b>	<b>1</b>	<b>The skull</b>	Bones, cranial fossa, foramina, cranial cavity, orbit, nasal cavity, para nasal sinuses, oral cavity	
<b>4</b>	<b>2</b>	<b>1</b>	<b>The back and upper extremity</b>	Musculature, joints, vessels and nerves	
<b>5</b>	<b>2</b>	<b>1</b>	<b>The lower extremity</b>	Musculature, joints, vessels and nerve	
<b>6</b>	<b>2</b>	<b>1</b>	<b>The Thorax</b>	Lungs and pleura, mediastinum, heart and pericardium,	
<b>7</b>	<b>2</b>	<b>1</b>	<b>The Abdomen</b>	Abdominal wall, regions, GI tract, liver, spleen, pancreas	

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<b>8</b>	<b>2</b>	<b>1</b>	<b>The Abdomen</b>	kidneys, ureter and adrenal glands, nerves and blood vessels
<b>9</b>	<b>2</b>	<b>1</b>	<b>The Pelvis</b>	Reproductive organs, urinary bladder, urethra, rectum, anal canal, perineum, blood vessels and nerves
<b>10</b>	<b>2</b>	<b>1</b>	<b>The Head and Neck</b>	General description, cranial cavity, meninges, brain and its blood supply
<b>11</b>	<b>2</b>	<b>1</b>	<b>Cranial Nerves and the face</b>	All 12 cranial nerves, facial expression muscles, and the scalp
<b>12</b>	<b>2</b>	<b>1</b>	<b>The Orbits</b>	Eyelids, lacrimal apparatus, muscles and nerves of the orbit, the eye ball,
<b>13</b>	<b>2</b>	<b>1</b>	<b>The Ear and infra temporal fossa</b>	Temporomandibular joint, temporal fossa, infra temporal fossa and pterygopalatine fossa
<b>14</b>	<b>2</b>	<b>1</b>	<b>The Neck</b>	Triangles of the neck, thyroid and parathyroid glands, pharynx and larynx, nasal cavity and oral cavity, teeth and gingiva
<b>15</b>	<b>2</b>	<b>1</b>	<b>Central Nervous System</b>	Introduction to CNS, spinal cord, the brainstem
<b>16</b>	<b>2</b>	<b>1</b>	<b>Central Nervous System</b>	Cerebellum, cerebrum, ventricles of the brain, cerebrospinal fluid
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

**GOAL:**

This course provided to learn and understand human body's structure and construction.

**COURSE OBJECTIVE:**

The students should be able to explain:

**1. Theory courses:**

- a. Scope of anatomy and basic terminology used in this subject.
- b. Osteology: structure, composition and function of the skeleton and movement of the joints.
- c. Muscular system: skeletal muscles and their function.
- d. Anatomy of the respiratory organs: larynx, trachea, bronchus and lungs.

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- e. Basic anatomy of the heart, major blood vessels, heart chambers and valves, cardiac conduction system.
- f. Gross anatomy of the gastrointestinal tract, anatomy of liver, pancreas and gall bladder.
- g. Urinary system: various parts and structures of the kidney, ureter, urinary bladder and urethrae.
- h. Male and female reproductive organs, sex differentiation.
- i. General anatomy of the Head and neck: the eye ball, ears, nasal cavity, oral cavity, larynx and pharynx,
- j. Nervous system: different parts of the brain and spinal cord, cranial nerves and their functions, spinal nerves, brachial plexus, lumber and sacral plexus.

**2. Practical courses:**

- a. Identification and description of all anatomical structures.
- b. Study of human skeleton, demonstration of different models ( upper extremity, lower extremity, thoracic and abdominal viscera, face and brain)
- c. Study of anatomy only with the help of Anatomy Atlas, charts, slides and models.

**SKILLS**

Students could be described:

- ✓ the basic concepts of anatomy beginning from the cell organization to organ system function,
- ✓ the basic concepts of general anatomy including skeleton and musculoskeletal,
- ✓ The anatomy of Thorax Abdomen and pelvis,
- ✓ The anatomy of upper limb, lower limb and head and neck,
- ✓ The knowledge about endocrine and nervous system.
- ✓ vocabulary of appropriate terminology to effectively communicate information related to anatomy

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Models
- ✓ Video demonstration
- ✓ Study radiographs of upper and lower limb.
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

- 1. Gray's anatomy of medical students
- 2. Clinical anatomy by Richard snell

Medical Cellular and Molecular Biology

<b>Medical Cellular and Molecular Biology</b>				
<b>Discipline</b>		<b>Basic Science</b>		
<b>Department</b>		<b>BIOLOGY</b>		
<b>Course Title</b>		<b>Biology</b>		
<b>Course code</b>		<b>ML213</b>		
<b>Prerequisite</b>		<b>General Biology</b>		
<b>Class</b>		<b>First class</b>		
<b>Semester</b>		<b>2</b>		
<b>Number of Credits</b>		<b>3</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>Biological membrane</b>	Cell membrane, membrane lipids, phospholipids; cholesterol and glycopospholipids, Change in phospholipids cause some disease
<b>2</b>	<b>2</b>	<b>1</b>	<b>Membrane proteins</b>	Peripheral and integral proteins
<b>3</b>	<b>2</b>	<b>1</b>	<b>Membrane proteins organization</b>	Different structure of membrane protein
<b>4</b>	<b>2</b>	<b>1</b>	<b>Water molecules movement across the membrane</b>	Osmosis, simple diffusion, active transport and ion channels
<b>5</b>	<b>2</b>	<b>1</b>	<b>Cytoskeleton</b>	Microfilaments, actins, tropomyocin, teryonin and tropomoduline
<b>6</b>	<b>2</b>	<b>1</b>	<b>Cytoskeleton</b>	Types of muscles, Cardiac muscles, skeletal muscles and smooth muscles
<b>7</b>	<b>2</b>	<b>1</b>	<b>Microtubules</b>	axonemal microtubules, Structure and function

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<b>8</b>	<b>2</b>	<b>1</b>	<b>Organelles</b>	Nucleus, nucleolus, Structure and function
<b>9</b>	<b>2</b>	<b>1</b>	<b>Endoplasmic reticulum</b>	Structure, function, RER and SER
<b>10</b>	<b>2</b>	<b>1</b>	<b>Golgi</b>	Structure and function
<b>11</b>	<b>2</b>	<b>1</b>	<b>Lysosome</b>	Enzyme and their secretion
<b>12</b>	<b>2</b>	<b>1</b>	<b>Endocytosis, Endosome and lysosome</b>	Structure and function
<b>13</b>	<b>2</b>	<b>1</b>	<b>Mitochondria</b>	ATP ,oxidative phosphorylation, Structure, function and Genetics system of mitochondria, diseases and mutation of mtDNA
<b>14</b>	<b>2</b>	<b>1</b>	<b>Paroxysms</b>	Structure and function
<b>15</b>	<b>2</b>	<b>1</b>	<b>Cell division</b>	Mitosis and meiosis,
<b>16</b>	<b>2</b>	<b>1</b>	<b>Nucleic acid</b>	DNA, RNA, (rRNA, tRNA, mRNA) and their functions

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

### **GOAL:**

This course introduces the principles and concepts of biology. Emphasis is on basic biological chemistry, cell structure and function, metabolism and energy transformation, genetics, evolution, classification, and other related topics.

### **COURSE OBJECTIVE:**

Students will be able to know:

- ✓ Cell structure, all organelles and their structure and functions,
- ✓ Transfer of different molecules across the membrane, membrane proteins,
- ✓ Structure and function of DNA and RNA, genetic system of mitochondria and its genes.

### **SKILLS**

Upon completion, students should be able to demonstrate understanding of life at the molecular and cellular levels

### **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL

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- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Medical cell Biology , Third Edition, 2008
2. Molecular biology, Third Edition, 2010
3. Cell biology, Third Edition, 2012
4. The Cell, third edition, 2007

Second year: First Semester

Islamic studies 3

<b>ISLAMIC STUDIES 3</b>					
<b>Discipline</b>		<b>Relegious</b>			
<b>Department</b>		<b>Islamic Studies</b>			
<b>Course Title</b>		<b>Worships</b>			
<b>Course requisites</b>		<b>ISLAMIC STUDIES 2</b>			
<b>Course code</b>		<b>MI301</b>			
<b>Academic year</b>		<b>II</b>			
<b>Semester</b>		<b>3</b>			
<b>Number of Credits</b>		<b>1</b>		<b>Theory</b>	<b>1</b>
				<b>Practical</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> General Information regarding worships (Ebadat)	
<b>2</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> types of worships (Ebadat)	
<b>3</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> Pillars of worships(Ebadat).	
<b>4</b>	<b>1</b>		<b>Worships</b>	<b>Worships :</b> conditions of worships (Ebadat)	
<b>5</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> difference between obedience & worship	
<b>6</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> Target of worship.	
<b>7</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> Worthy of Worship	
<b>8</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> Outcome of Worship	

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<b>9</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> The Factors and Lithurgy of Worship
<b>10</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> Bedaat (Inovation) in worships.
<b>11</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> General Information about Philosophy of Worships and Phylosophy of Salah
<b>12</b>	<b>1</b>		<b>Worships</b>	<b>Worships:</b> The preyer in summation (Jamat), Eid and Jenaza preyer
<b>13</b>	<b>1</b>		<b>Worships</b>	<b>Memorization and translation of:</b> Surah 78 – 84
<b>14</b>			<b>Worships</b>	<b>Memorization and translation of:</b> Surah 78 – 84
<b>15</b>			<b>Worships</b>	<b>Special Duaa (prayers):</b> accordig to Hadith and Sunnah
<b>16</b>	<b>1</b>		<b>Worships</b>	<b>Special Duaa (prayers):</b> accordig to Hadith and Sunnah

1 Lecture = 50 minutes  
Hour per week = 1  
Total credit = 1

**Goal:**

Worship: General Information regarding worships (Ebadat) and Memorization and translation of: Surah 78 – 84.

**Course objectives:**

- ✓ Explain basic information about Islamic studies
- ✓ To understand of the students regarding Islamic civilization
- ✓ To to perform prayers and other worships.

**Skills:**

- ✓ To build up Communications skill.
- ✓ The method of Memorization and translation of: Surah 78 – 84.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%

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✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**✓ References**

1. Quran
2. Hadis

Foreign Language & Medical Terminology 3

<b>Foreign Language &amp; Medical Terminology 3</b>				
<b>Discipline</b>		English language		
<b>Department</b>		English department		
<b>Subject</b>		ESP/Professional English		
<b>Course code</b>		ML302		
<b>Prerequisite</b>		Foreign Language & Medical Terminology 2		
<b>Class</b>		Second year		
<b>Semester</b>		third		
<b>Number of Credits</b>		<b>2</b>	<b>Theory</b>	<b>0</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>		<b>2</b>	<b>The skin 1</b>	<p>Speaking :Talk about some types of skin lesions</p> <p>Reading : Read the passage on page 70</p> <p>Listening : listen to the pronunciations of the new words in the cassette</p> <p>Writing : Write about the skin injuries of someone who has involved in a fight in a restaurant</p>
<b>2</b>		<b>2</b>	<b>The skin 2</b>	<p>Talking about types of injuries to the skin</p> <p>Read a case report that consist of injury types</p> <p>Talk about different kinds of sores and the similar words used for</p>
<b>3</b>		<b>2</b>	<b>The urinary system</b>	<p>Speaking :Talk about urinary system</p> <p>Reading :readthe passages silently and then loudly by one of the students</p> <p>Listening :listen to the pronunciation of the new words</p> <p>Writing: Write a number doctor's questions about urinary symptoms of a patient .</p>

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4		2	<b>Endoscopy</b>	Speaking: Talk through the process of endoscopy with a patient and also about use of Reading: Read the relevant passages on p.80 Listening: listen to a doctor talking through endoscopy of a patient
5		2	<b>X-ray / CT</b>	Speaking :Talk about the use of CT and x-ray Reading : Read the passages Listening ;listen to the pronunciation of the new words Writing : Write about the benefits of using ultrasound in diagnosis of disease in your country
6		2	<b>MRI</b>	Speaking: Describe an MRI and ultrasound Reading :Read these passages Listening :listen to the pronunciation of the new words Writing :Write a prescription for a patient of yours
7		2	<b>Ultrasound</b>	Speaking: Talk about the use of ultrasound Reading : Read the passages on p.90 Listening :listen to some one who is talking about the importance of ultrasound examination Writing: write a short article about the different kinds of therapies
8		2	<b>ECG</b>	Speaking talk about the method of using ECG Reading :Read the passages on p.94 Listening :listen to the pronunciation of the new words Writing:write an advice for a countryman taking some vaccine to prevent measles
9		2	<b>Immunization</b>	Speaking :Talk about false positive and false negative r Reading :read the passages p.98 Listen : listen to the words pronunciation . Writing :write about your views about immunization in your country
10		2	<b>Epidemiology</b>	Speaking :talk about the rates of mortality and birth

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				<p>Reading :read the these passages .on p.96          Listening :listen to pronunciation of the new words in the cassette          Writing :write a passage about how to manage a research in a hospital</p>
11		2	<b>Medical ethics</b>	<p>Speaking :talk about he bioethical issues and assisted dying :          read these passages on p 98          Listening: listen for a medical conversation          Writing :write about guide line in Afghan of public health</p>
12		2	<b>Research</b>	<p>Speaking : talk about case control and cohort studies          Reading :read the passages on p.100          Listening :listen to the new words          Writing :Write about a trial</p>
13		2	<b>Taking history</b>	<p>Speaking :talk about full case history          Read these passages on p. 102          Listening :listen the correct pronunciation of some of psychiatric problems          Writing :Write a case history of a patient</p>
14		2	<b>Taking history part 2</b>	<p>Speaking ;talk about drug history          reading : read the passages silently on p.104          Listening :listen to medical conversation          Writing :Write about a patient who has a tumor, and how to give him the bad news</p>
15		2	<b>Taking history part 3</b>	<p>Speaking :Talking about patient's ideas , concerns and expectation          Reading :read these passages on p 106          Listening :listen to the new words pronunciation          Writing :write a short article about taking history of diabetic patient .</p>
16		2	<b>Basic investigation</b>	<p>Speaking: talk about ophthalmoscopy/ speak about lab abbreviations          Reading. Read the passage on p.76          Listening: listen to a conversation between a doctor and a patient</p>

Hour per week = 2  
Total credit = 2

### **Goal:**

By the end of this course the students should be able to enhance their language skills of speaking, reading ,listening and writings and also they will be able to use Medical dictionaries such as Dorland, Oxford etc.

### **Course objectives:**

- ✓ To know the skin.
- ✓ To know the imaging tools in medicine.
- ✓ To know the immunization and epidemiology.

### **Skills:**

- ✓ To build up Communications skill.
- ✓ To know the skills of research.
- ✓ To know the skills of talking about the history of the patients.

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference:**

1. Glendinning .H.E. & Howard .R, (2007), Professional English in use. Cambridge: Cambridge university press.
2. English grammar by Betty Schampfer , 3rd edition
3. Essential grammar in use by Roymound Murphy ,3rd edition ,2007
4. New Inter change book one ,by Jack C Richards ,students text book ,2008

General Microbiology

<b>General Microbiology</b>				
<b>Discipline</b>		<b>Para clinic</b>		
<b>Department</b>		<b>Microbiology</b>		
<b>Course Title</b>		<b>General Microbiology</b>		
<b>Course code</b>		<b>ML314</b>		
<b>Prerequisite</b>		<b>Medical Cellular and Molecular Biology</b>		
<b>Class</b>		<b>2</b>		
<b>Semester</b>		<b>3</b>		
<b>Number of Credits</b>		<b>3</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	Introduction to Microbiology	Microbial world, their importance in human life, biomass and it's composition; beneficial and harmful microbes.
<b>2</b>	<b>2</b>	<b>1</b>	Different types of Micro-organisms	Cellular and non cellular microorganisms; prions, viruses, viroids. Prokaryotes (bacteria and archae).
<b>3</b>	<b>2</b>	<b>1</b>	Different types of micro-organisms	Protista; Protozoa, fungi, algea, slime molds
<b>4</b>	<b>2</b>	<b>1</b>	Bacteriology, Principal forms	Classification according to morphology; cocci, bacilli, spirella.
<b>5</b>	<b>2</b>	<b>1</b>	Bacterial Cell structure	Cytoplasmic structures; Nucleod, ribosomes, vesicles, granules.
<b>6</b>	<b>2</b>	<b>1</b>	Bacterial Cell structure	Cell envelop; gram positive and gram negative cell envelops and their differences.
<b>7</b>	<b>2</b>	<b>1</b>	Bacterial Cell structure	Flagella, pili, Glycocalyx.
<b>8</b>	<b>2</b>	<b>1</b>	Endospore and Classification	Spore and its importance in bacterial sustainability; spore forming bacteria, sporulation.

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9	2	1	Physiology; biochemical composition of bacterial cell	How a bacteria lives?; Water and solid components of bacterial cell.
10	2	1	Transportation Mechanisms and classification according to nutrition	Free, facilitated and active transport; autotrophs and heterotrophs.
11	2	1	Oxygen, pH and temperature requirements	Classification of bacteria according to O <sub>2</sub> consumption; role of temperature and pH on bacterial growth.
12	2	1	Energy production	Photosynthesis and chemosynthesis; respiration and fermentation.
13	2	1	Growth and reproduction	Generation time and its importance in prediction of clinical course of an infection; Growth curve
14	2	1	Growth requirements, Enzymes	Organic and inorganic compounds needed for bacterial growth; role of enzymes in bacterial metabolism.
15	2	1	Normal microbial flora	Normal flora of the body and their importance; types of normal flora
16	2	1	Normal microbial flora	Flora containing/free systems.
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

**GOAL:**

Explanation of Microbial world, their importance in human life, biomass and its composition; beneficial and harmful microbes. As well as Cellular and non cellular microorganisms; prions, viruses, viroids. Prokaryotes (bacteria and archae).

**Course objectives:**

- ✓ -Summarize the classification, taxonomy and bio metabolism of microorganism.
- ✓ -Correlate clinical and laboratory findings to organism identification and patient condition.
- ✓ -Understand clinical microbiology research implications to current and future practice.
- ✓ -Identify different kinds of microorganisms, isolation and culture of microorganisms.

**Skills:**

- ✓ To build up Communications skill.
- ✓ How to differentiate the gram positive and gram negative.
- ✓ How to know the different structure of the bacteria.

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference:**

1. Microbiology, 2nd Edition (Lippincott's Illustrated Reviews): Richard A. Harvy, Pamela C. Champe, Bruce D. Fisher
2. Clinical microbiology made ridiculously simple, 3rd edition: Mark Gladwin, M.D; Bill Trattler, M.D.
3. Baily Scott Diagnostic Micribiology, 14 th edition.patricia, Elsevier (Mosby) Inc. (ISBN:978-0323354820).



Human Physiology

<b>Human Physiology</b>					
<b>Discipline</b>		<b>Medical Technology</b>			
<b>Department</b>		<b>Physiology</b>			
<b>Course Title</b>		<b>Human Physiology</b>			
<b>Course code</b>		<b>ML315</b>			
<b>Prerequisites</b>		<b>Anatomy- Histology</b>			
<b>Class</b>		<b>2</b>			
<b>Semester</b>		<b>3</b>			
<b>Discipline</b>		<b>Medical Technology</b>			
<b>Number of Credits</b>		<b>3</b>		<b>Lecture</b>	<b>2</b>
				<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>2</b>	<b>1</b>	<b>Cell Physiology and Nerve Cell Physiology</b>	Introduction to cell physiology Nerve cell physiology Function , Synapses, mechanisms of conduction	
<b>2</b>	<b>2</b>	<b>1</b>	<b>Muscle Physiology</b>	Muscle physiology function and mechanisms of contraction Types of contraction	
<b>3</b>	<b>2</b>	<b>1</b>	<b>Blood Physiology</b>	RBC, Structure and function, Hb, WBC, Structure and function	
<b>4</b>	<b>2</b>	<b>1</b>	<b>Blood Physiology</b>	Innate Immunity and acquired immunity Structure, types and function of Antibodies, types of T-Cells	
<b>5</b>	<b>2</b>	<b>1</b>	<b>Blood Physiology</b>	Hemostasis and blood types	
<b>6</b>	<b>2</b>	<b>1</b>	<b>Gastrointestinal Physiology</b>	Introduction to GI physiology, Mechanisms of GI tract movements and reflexes GI secretions, Hormones and regulations	
<b>7</b>	<b>2</b>	<b>1</b>	<b>Gastrointestinal Physiology Respiratory System</b>	Digestion and Absorption Introduction to RS, Mechanisms of Respiration, Inspiration and Expiration	

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<b>8</b>	<b>2</b>	<b>1</b>	<b>Respiratory System</b>	Types of Respiration and gases exchange Regulation of Respiration
<b>9</b>	<b>2</b>	<b>1</b>	<b>Endocrine Physiology</b>	Introduction of endocrine system Pituitary hormones and its functions in the body
<b>10</b>	<b>2</b>	<b>1</b>	<b>Endocrine Physiology</b>	Thyroid hormones, Adrenal cortex, Pancreas and Para thyroid hormones Gonadotropins, secretions and functions
<b>11</b>	<b>2</b>	<b>1</b>	<b>Reproductive Physiology</b>	Female reproductive physiology, Menstruation Pregnancy, Parturition and lactation
<b>12</b>	<b>2</b>	<b>1</b>	<b>Reproductive Physiology</b>	Male reproductive system, spermatogenesis Fertilization and gestation Male sex hormone (Testosterone) Male sexual act
<b>13</b>	<b>2</b>	<b>1</b>	<b>Urinary System Physiology</b>	Introduction to Urinary System, Filtration Reabsorption of water and materials in tubules
<b>14</b>	<b>2</b>	<b>1</b>	<b>Cardio Vascular System</b>	Introduction to CVS, Cardiac Cycle, Action Potential, Automatism
<b>15</b>	<b>2</b>	<b>1</b>	<b>Cardio Vascular System&amp;Central Nervous System</b>	Blood Circulation Major and Minor Blood Pressure, Pulse, Capillary Circulation
<b>16</b>	<b>2</b>	<b>1</b>	<b>Central Nervous System and Special Senses</b>	Introduction to CNS physiology, Sensory and Motor Functions Autonomic Nervous system (Sympathetic and Para sympathetic) Special Senses Vision Hearing Taste and Smell

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

## **GOAL**

An overall goal of this course is to enable students to understand the role of molecules, cells, tissues, organs, and organ systems (endocrine, nervous, muscular and immune systems) in human health and disease. This class focuses on understanding physiology – the functioning of a living organism and its component parts. This requires going beyond memorization of facts to acquire an understanding of how and why the body functions the way it does, and what happens when it does not function properly.

## **COURSE OBJECTIVE:**

The students should be able:

- ✓ To understand the basic concepts of physiology beginning from the cell organization to organ system function.
- ✓ To understand the organization of cell, tissue organ and system with respect to their functions.
- ✓ To Understand the physiology of Respiration, G.I.T, Urinary system and Endocrine system
- ✓ To understand the basic concepts of physiology beginning from the organization of the systems to their role in the body.
- ✓ To understand the organization and function of various systems
- ✓ To understand the physiology of Blood, CVS, Nervous System and special senses
- ✓ Students will be able to understand immunity, its types and immune reactions

## **SKILLS**

- ✓ At the end of the session, students will be able to explain the cell structure, organelles, cell permeability, and cell membrane transport, explain the Nerve cell definition, structure of N.Cell, function of nerve cell, Define the Blood, explain the blood components (Plasma and Blood Cells) and perform tests such as WBC and RBC count. Define what is immunity, types of immunity (Innate and Acquired Immunity, What is vaccines and what do vaccines in the body in term of immunization, physiological function of respiratory, respiratory, gastrointestinal, CVS, reproductive and urinary system.
- ✓ Also at the end of the session students will be able to do this practice:
  1. Introduction to microscope
  2. Bleeding time
  3. Clotting time
  4. WBCs count
  5. RBCs count
  6. Platelets count
  7. Reticulocytes count
  8. Spirometer
  9. Electrocardiography
  10. Blood Pressure Measurement
  11. Normal and abnormal ECG interpretation
  12. Pulse rate measurement
  13. Heart sounds

## **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

## **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%

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✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. GUYTON AND HALL Textbook of Medical Physiology, Twelfth Edition, 2011.

General Biochemistry

<b>General biochemistry</b>				
<b>Discipline</b>		<b>Medical Laboratory Technology</b>		
<b>Department</b>		<b>Medical Technology</b>		
<b>Course Title</b>		<b>General Biochemistry</b>		
<b>Course code</b>		<b>ML316</b>		
<b>Prerequisite</b>		<b>Chemistry</b>		
<b>Class</b>		<b>2</b>		
<b>Semester</b>		<b>3</b>		
<b>Number of Credits</b>		<b>4</b>		
		<b>Theory</b>	<b>2</b>	
		<b>Practical</b>	<b>2</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>2</b>	<b>Biochemistry &amp; Carbohydrates</b>	<b>Introduction, Definition of Biochemistry, Relationship Between Biochemistry and Medicine &amp; Introduction, Definition, Classification</b>
			<b>Monosaccharaides</b>	<b>Introduction of the most important monosaccharaides</b>
<b>2</b>	<b>2</b>	<b>2</b>	<b>Disaccharides</b>	<b>Introduction of Disaccharides, Maltose, Lactose, Sucrose.</b>
			<b>Poly saccharides</b>	<b>Introduction, Homo Poly saccharides (Starch, Glycogen ,Inulin, Cellulose, Dextrin ) Hetero Poly saccharides (Hyaluronic acid, Chondroitin sulfate, Heparin ) and (Glycoproteins</b>
<b>3</b>	<b>2</b>	<b>2</b>	<b>Digestion and Absorption of Carbohydrates</b>	<b>Digestion and Absorption of Carbohydrates</b>
			<b>Lipids</b>	<b>Introduction, Classification , Derived Lipids : Fatty acid (Definition, Types , Essential fatty acid , Melting point , Eicosanoids )Glycerol.</b>
<b>4</b>	<b>2</b>	<b>2</b>	<b>Steroides and Sterols &amp; Simple Lipids</b>	<b>Introduction, Cholesterol, Other Sterols: 7-dehydrocholesterol &amp; Introduction , Neutral</b>

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				fats or Triglycerides Waxes
			Compound lipids	Introduction 1- Phospholipids Diphosphatidylglycerol, lecithins,cephalins , phosphotidyl serine , phosphotidyl Inositol , lyso phosphatides, plasmalogens, sphingomyeline) 2- Glycolipids(cerebrosides,Gangliosides)
5	2	2	Digestion and Absorption of lipids	Bile and role of it in Digestion
			Digestion and Absorption of lipids	Digestion of lipids and absorption of lipids
6	2	2	Amino Acid and Proteins:	Introduction Classification and structure of Amino acids, Essential Amino acids, Physicochemical Properties
			Properties of Amino acids	Chemical Properties: Due to Carboxylic Group (Formation of Ester, Formation of Amide, Formation of Amine by Decarboxylation). Due to Amine Group (Salt formation with acids, Acylation, Methylation, Reaction with HNO <sub>2</sub> , Reaction with CO <sub>2</sub> , Oxidative Deamination).
7	2	2	Peptide Bond Proteins	[Classification, Structure, Reactions of Proteins (Reaction with water, Denaturation, Reaction with Ions].
			Nucleoprotein	Base purine, pyrimidin, sugar, Nucliotide, Nucleoside
8	2	2	Nucleoprotein	Nucleic acid (DNA, RNA)
			Digestion and Absorption of Proteins	Digestion of Proteins and absorption of Proteins
9	2	2	Vitamins:	(Introduction, Classification), Water Soluble Vitamins Fat Soluble Vitamins.
			Vitamin A	(Structure, Forms, Dietary Sources, Daily Requirement, Absorption, Storage and Transport, Functions of vit.A).

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10	2	2	Vit.D and vit.E	(Structure, Forms, Dietary Sources, Daily Requirement, Absorption, Storage and Transport, Functions of Vit.D and vit.E.
			Vit.K	Structure, Forms, Dietary Sources, Daily Requirement, Absorption, Storage and Transport, Functions of Vit.K.
11	2	2	Water Soluble Vitamins: Vit. B1, Vit. B2	Structure, Metabolism, Sources, Metabolic Role, Deficiency of some vitamins, Daily requirement).
			Vit. B5, Vit. B6	Structure, Metabolism, Sources, Metabolic Role, Deficiency of some vitamins, Daily requirement).
12	2	2	Vit.PP ,Vit. H	Structure, Metabolism, Sources, Metabolic Role, Deficiency of some vitamins, Daily requirement).
			Vit. B12, Vit. Bc ,Vit.C	Structure, Metabolism, Sources, Metabolic Role, Deficiency of some vitamins, Daily requirement).
13	2	2	Enzymes	Introduction, properties, factors affecting Enzymes activity .Mechanism of Enzyme action
			Enzymes	Enzymes Inhibition , Regulation of Enzymes activity
14	2	2	Enzymes	Classification , Role of metals in Enzymes activity ,Co Enzymes
			Enzymes	Diagnostic value of Enzyme levels.
15	2	2	Metabolism of Water and Non Organic Substances	Introduction Fluid Compartments of the Body, Determination of Body Fluid Compartments , Gain and Loss of Body Water, Regulation of Water Balance, Effects of a Pure Water Deprivation, Water Excess or Water Intoxication.
			Metabolism of Water and Non Organic Substances	Metabolism of Non Organic Substances: Introduction, The electrolytes of Body Fluids, Sodium, Potassium, Magnesium, Chloride.
16	2	2	Metabolism of Water and Non Organic	Metabolism of Minerals and Trace Elements: Introduction, Iron, Manganese, Calcium,

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			<b>Substances</b>	<b>Phosphorus, Zinc, Molybdenum,Chromium</b>
			<b>Metabolism of Water and Non Organic Substances</b>	<b>Selenium, Iodine, Sulfur, Fluorine, Nickel, Copper, Cobalt.Aluminum (Aluminium) and Silicone.</b>
<p>1 Lecture = 50 minutes Hour per week = 4 Total credit = 4</p>				

**Goal:**

The student know the concepts of the macronutrients, micronutrients and metabolism of the water and non-organic substances.

**COURSE OBJECTIVE:**

- ✓ Describe basic biochemical knowledge and develop an understanding of the chemistry of key biological molecules,
- ✓ Identify biochemical relevant reactions.
- ✓ Describe vitamin and enzymes, metabolism of water and non-organic substances, laboratory works in relevant issues.
- ✓ Interpret biological pathways in terms of thermodynamics, chemistry, regulation and protein mechanisms and apply these skills to the understanding of novel pathways.
- ✓ Read and evaluate current articles in primary biochemistry literature pertaining to biological chemistry.

**SKILLS**

1. Identify the levels of structure in proteins and describe the stabilization of these structures,
2. Describe the structure and mechanism of representative enzymes in biochemical pathways,
3. Interpret plots of enzyme kinetic data,
4. Describe representative mechanisms of enzyme catalysis,
5. Describe the primary catabolic and anabolic pathways pertaining to the following molecular classes:
  - a. Carbohydrates
  - b. Fats and lipids
  - c. Amino Acids
  - d. Steroids
6. For each pathway in 5, identify the key regulatory points, the energetics of the reactions and the key chemical transformations involved,
7. Describe structure and function and mechanisms and effects of vitamins in bio reactions,
8. Doing of various experiments of biochemistry in laboratory,
9. Read and interpret scientific articles in biochemistry.

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments

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- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Medial biochemistry, second edition, 2006
2. Lehninger A.L. biochemistry, The molecular basis of cell structure and funciton, fifth edition, 2008
3. Lubert Stryer Biochemistry ,Fifth edition, 2002

**Systemic Histology**

<b>Systemic Histology</b>				
<b>Discipline</b>		<b>Para clinic</b>		
<b>Department</b>		<b>Histology</b>		
<b>Course Title</b>		<b>Systemic Histology</b>		
<b>Course code</b>		<b>ML310</b>		
<b>Prerequisites</b>		<b>Anatomy- General Histology</b>		
<b>Class</b>		<b>2<sup>nd</sup></b>		
<b>Semester</b>		<b>3</b>		
<b>Discipline</b>		<b>Para clinic</b>		
<b>Number of Credits</b>		<b>3</b>	<b>Lecture</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>Introduction</b>	Definition, General information about structure of the organs, Parenchyma, Stroma, Hollow and solid organ, Moist membranes
<b>2</b>	<b>2</b>	<b>1</b>	<b>Circulatory system</b>	Heart, Arteries, Veins, Capillaries, Lymphatic vascular system, Clinical considerations

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<b>3</b>	<b>2</b>	<b>1</b>	<b>Lymphoid Tissue</b>	Diffused lymphatic tissue, lymphoid organs, lymph nodes, tonsils, spleen, thymus, bursa, clinical considerations
<b>4</b>	<b>2</b>	<b>1</b>	<b>Endocrine system</b>	Pituitary gland, Thyroid glands, Parathyroid glands, Suprarenal glands, Pineal body, Clinical considerations
<b>5</b>	<b>2</b>	<b>1</b>	<b>Integumentary system</b>	Skin, Epidermis, Dermis, Derivatives of skin, Hair, Nail, Sebaceous glands, Sweat glands, Arrector pili muscle, Clinical considerations
<b>6</b>	<b>2</b>	<b>1</b>	<b>Respiratory system</b>	Conducting portion, Nasal Cavity, Nasopharynx, Larynx, Trachea, Extrapulmonary bronchi, Intrapulmonary bronchi, Respiratory portion, Clinical considerations
<b>7</b>	<b>2</b>	<b>1</b>	<b>Digestive system</b>	Brief description of the oral cavity and associated structures, Salivary glands, Mucosal membrane, Lips, Tongue and Teeth.
<b>8</b>	<b>2</b>	<b>1</b>	<b>Digestive system</b>	Gastrointestinal tract, Esophagus and Stomach, detailed microscopic study and clinical considerations
<b>9</b>	<b>2</b>	<b>1</b>	<b>Digestive system</b>	Small intestine, Large intestine, anatomical parts and detailed microscopic study, clinical considerations
<b>10</b>	<b>2</b>	<b>1</b>	<b>Digestive system (appendages)</b>	Liver, Gallbladder, Pancreas, Liver structure, Classical lobules, Central vein, Hepatocytes, Sinusoids, Portal area, Portal lobules, Liver acinus, Billiary passage
<b>11</b>	<b>2</b>	<b>1</b>	<b>Digestive system (appendages)</b>	Gallbladder, Pancreas, Exocrine pancreas, Endocrine pancreas, detailed histological study and clinical considerations
<b>12</b>	<b>2</b>	<b>1</b>	<b>Urinary System</b>	Kidneys, Uriniferous tubules, Extra renal excretion passage, Clinical considerations
<b>13</b>	<b>2</b>	<b>1</b>	<b>Female Reproductive system</b>	Ovary, Genital ducts, Oviduct, Uterus, Vagina, External genitalia, Mammary glands, Clinical considerations
<b>14</b>	<b>2</b>	<b>1</b>	<b>Male Reproductive system</b>	Testis, The male genital ducts, Accessory glands, penis, Clinical considerations
<b>15</b>	<b>2</b>	<b>1</b>	<b>Organs of special senses (The eye)</b>	Visual organ, Wall of the eye, Refractive media, Optic nerve, Accessory structure of the eye, Clinical considerations

<b>16</b>	<b>2</b>	<b>1</b>	<b>The Vestibulocochlear apparatus</b>	External ear, Internal ear, Par vestibularis, Pars cochlearis Clinical considerations.
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## GOAL

The aim of this course is to provide students with a thorough understanding of the microscopic appearance and function of normal structures in the human body. This allows students to integrate this information with other disciplines such as Gross Anatomy, Pathology, and Physiology.

The Systematic Histology component of the course will investigate how these basic tissues combine to form organs, which operate together to maintain homeostasis. By convention, organs, which work together to achieve a particular function are grouped together as systems

## COURSE OBJECTIVE:

The students should be able to:

- ✓ Understand the components of body and different types of tissues in different organs and system
- ✓ Provide a foundation of the fundamental concepts of the microscopic anatomy of the human body;
- ✓ Develop an understanding how organ integrity and functions are maintained by the organization of cells and tissues; and
- ✓ Promote critical thinking of the clinical consequences of cellular disorders and tissue-related diseases, intracellular pathogens, cancer and diabetes.

## SKILLS

Upon completion of this course, students will be able to:

- ✓ demonstrate an understanding of the microscopic organization and relationships of cells, tissues and organs of the human body;
- ✓ identify cells and tissues and describe their functions;
- ✓ develop problem solving skills to evaluate both normal and pathologic structure and function of cells and tissues that comprise the organs of the human body; and
- ✓ demonstrate critical thinking skills to describe possible pathologic outcomes of dysfunctional cells and tissues

## TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Atlas of Histology with functional correlation. Di Fiore's international edition.

General pathology

<b>General pathology</b>				
Discipline		Para clinic		
Department		Pathology		
Course Title		General pathology		
Course code		ML317		
Prerequisites		General Histology		
Class		2		
Semester		3		
Number of Credits		3	Lecture	2
			Practical	1
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	1	Cell injury, cell death, and adaptation	Overview of Cellular Responses to Stress and Noxious Stimuli.-Cellular Adaptation to Stress: Hypertrophy, Hyperplasia, Atrophy, and Metaplasia
			Overview of Cell Injury and Cell Death	Causes of Cell Injury and Morphology of Cell and Tissue Injury
2	2	1	Autophagy and Intracellular accumulation	<i>Fatty change (Steatosis), Cholesterol, protein, Glycogen, Pigments</i>
			Inflammation and repair acute inflammation	Overview of Inflammation and Tissue repair, Stimuli for acute inflammation, - Recognition of microbes, necrotic cells and foreign substances, and-Vascular change
3	2	1	Acute Inflammation  Morphologic Patterns of Acute	Cellular events: Leukocytes recruitment and Activation,  Leukocyte-Induced tissue injury, Defect in leukocyte function, Outcomes of acute inflammation

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			Inflammation	Serous inflammation, Fibrinous inflammation, Suppurative (purulent) inflammation and abscess formation, and Ulcerative inflammation.
4	2	1		Serous inflammation, Fibrinous inflammation, Suppurative (purulent) inflammation and abscess formation, and Ulcerative inflammation
				Serous inflammation, Fibrinous inflammation, Suppurative (purulent) inflammation and abscess formation, and Ulcerative inflammation
5	2	1	Chronic inflammation Systemic effects of	-Chronic inflammatory cells and mediators -Granulomatous inflammation
			inflammation	Fever, Elevated of Plasma Level of Acute- Phase Proteins, Leukocytosis, Other manifestation of the acute phase response and sepsis
6	2	1	Overview of tissue repair, Selected clinical example of tissue repair and fibrosis	Cell and tissue regeneration, Scar formation, Factors that influence tissue repair.
			<b>Nuclear and Cytoplasmic Staining</b>	Healing of skin wound, Healing by first intention, Healing by second intention, Wound strength.
7	2	1	Hemodynamic disorders	Hyperemia and Congestion, Edema, Hemorrhage
			Hemostasis and thrombosis	Normal Hemostasis, Thrombosis, Disseminated intravascular Coagulation (DIC)
8	2	1	Embolism and infarction	Pulmonary thromboembolism,-Systemic thromboembolism, Infarction.
			Hypersensitivity reactions	Causes of hypersensitivity reactions Types of hypersensitivity reaction Immediate (Type 1) hypersensitivity and Antibody

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				mediated diseases (Type II hypersensitivity)
9	2	1	Systemic immune diseases and rejection of transplants	Systemic lupus erythematosus, Rheumatoid arthritis, Sjögren syndrome, Systemic sclerosis, and Inflammatory myopathies
			Immune deficiency diseases	Primary (Congenital) immune deficiencies
10	2	1	Immune deficiency diseases	Secondary (Acquired) immune deficiencies Acquired Immunodeficiency Syndrome (AIDS)
			Neoplasia	Nomenclature, Characteristics of benign and malignant neoplasms, Epidemiology
11	2	1	Clinical aspects of neoplasia	Effects of tumor on host, Grading and Staging of Cancer Laboratory diagnosis of cancer
			Molecular diagnosis of Mendelian and complex disorders	Molecular diagnosis of copy abnormalities Direct detection of DNA mutation by polymerase chain reaction (PCR) analysis, Linkage and genome-wide association studies, Indications for genetic-analysis
12	2	1	Environmental and nutritional diseases	Health effects of climate change, Toxicity of chemical and physical agents, Environmental pollution
			Environmental and nutritional diseases	Effects of tobacco, Effects of alcohol
13	2	1	Injury by therapeutic drugs and drugs of abuse Injury by physical agents	Injury by therapeutic drugs: Adverse drug reactions Injury by nontherapeutic toxic agents (Drug abuse)
			<b>Pigments, Minerals, and Cytoplasmic granules</b>	Mechanical trauma, Thermal injury, Electrical injury Injury produced by ionizing radiation

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14	2	1	Nutritional diseases Obesity Diet and systemic diseases, Diet and Cancer	Malnutrition,Protein-Energy malnutrition Anorexia Nervosa and Bulimia
			<b>Immunohistochemical Staining</b>	Leptin,Adipose tissue,Clinical consequences of Obesity
15	2	1	General pathology of infectious diseases	General principle of microbial pathogenesis Categories of infectious agents
			General pathology of infectious diseases	Special techniques for identifying infectious agents New and emerging infectious diseases,Agents of Bioterrorism
16	2	1	How microorganisms cause disease	Mechanisms of viral injury,Mechanisms of bacterial injury,Immune evasion by microbes
			Spectrum of inflammatory responses to infection	Suppurative, Mononuclear/granulomatous, Cytopathic- cytoproliferative, Necrosis, and Chronic inflammation/scarring
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## GOAL

At the end of this course the students acquire the general knowledge of the inflammation, hemodynamic disorders and General pathology of infectious diseases.

## COURSE OBJECTIVE:

Getting to know and describe physiology, pathophysiology, pathology and diagnostic procedure of various disorders and inflammations.

## SKILLS

After completion of this course students will be able to:

- ✓ To know the principles of cell injury, inflammation, immunodeficiency diseases;
- ✓ To know the general pathology of infectious disease.

## TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion

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- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Robbins Basic Pathology, last edition

Second year: Second semester

Islamic Studies 4

<b>ISLAMIC STUDIES 4</b>				
<b>Discipline</b>		<b>Religious</b>		
<b>Department</b>		<b>Islamic studies</b>		
<b>Course Title</b>		<b>Political System In Islam</b>		
<b>Course code</b>		<b>ML401</b>		
<b>Prerequisite</b>		<b>ISLAMIC STUDIES 4</b>		
<b>Academic year</b>		<b>2</b>		
<b>Semester</b>		<b>4</b>		
<b>Number of Credits</b>		<b>1</b>	<b>Theory</b>	<b>1</b>
			<b>Practical</b>	<b>0</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>1</b>			<b>Political System in Islam</b>
<b>2</b>	<b>1</b>			<b>Politics &amp; Religion</b>
<b>3</b>	<b>1</b>			<b>Defination of shariat</b>
<b>4</b>	<b>1</b>			<b>General Information Related Politics</b>
<b>5</b>	<b>1</b>			<b>Individual Poltical rights, Counsel in Islam</b>
<b>6</b>	<b>1</b>			<b>Characteristics of Political Leaders, Needs for Slection of the Leader</b>
<b>7</b>	<b>1</b>			<b>General Information related Dectatorate.</b>
<b>8</b>	<b>1</b>			<b>Responsibilities of Islamci State</b>
<b>9</b>	<b>1</b>			<b>Charaterstics of Islamic Governments</b>
<b>10</b>	<b>1</b>			<b>Islam and Democracy</b>
<b>11</b>	<b>1</b>			<b>Basics of Internal Diplomacy in Islam</b>
<b>12</b>	<b>1</b>			<b>Basics of Forign Diplomacy in Islams</b>
<b>13</b>	<b>1</b>			<b>Memorization and translation of Surah 61 – 84</b>
<b>14</b>	<b>1</b>			<b>Memorization and translation of Surah 78 – 84</b>

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<b>15</b>	<b>1</b>			<b>Special Duaa (prayers) accordig to Hadith and Sunnah</b>
<b>16</b>	<b>1</b>			<b>Special Duaa (prayers) accordig to Hadith and Sunnah</b>
1 Lecture = 50 minutes Hour per week = 1 Total credit = 1				

**Goal:**

The students will be able to know the Islamic political system and general information related to it.

**Course objectives:**

- ✓ To know the Political System in Islam.
- ✓ To know the Politician and religion.
- ✓ To know the Individual Poltical rights, Counsel in Islam.

**Skills:**

- ✓ To build up Communications skill.
- ✓ How to apply Basics of Internal Diplomacy in Islam.
- ✓ How to apply Basics of foreign Diplomacy in Islam.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**✓ Refrences**

1. Quran
2. Hadis

Foreign Language & Medical Terminology 4

Foreign Language & Medical Terminology 4				
Discipline		Basic Science		
Department		English department		
Subject		ESP/Professional English & General English		
Course code		402		
Prerequisite		Foreign Language & Medical Terminology 3		
Class		Second year		
Semester		4		
Number of Credits		2	Theory	0
			Practical	2
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1		2	Physical examination	Physical examination
2		2	Mental state examination	Mental state examination
3		2		
4		2	Discussing treatment	Discussing treatment
5		2	Giving bad news	Giving bad news
6		2	Data presentation	Data presentation
7		2	Research article,	Research article,
8		2		
9		2	Abstracts	Abstracts
10		2	Conference presentation	Conference presentation
11		2	Case presentation	Case presentation
12		2	Case presentation	Case presentation
13		2	Medical abbreviations 1	Medical abbreviations 1
14		2	Medical abbreviations 2	Medical abbreviations 2
15		2	descriptive paragraph	descriptive paragraph

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<b>16</b>	<b>2</b>	Review	Review
Hour per week = 2 Total credit = 2			

**Goal:**

By the end of this course the students should be able to enhance their language skills of speaking ,reading ,listening and writings and also they will be able to use Medical dictionaries such as Dorland, Oxford etc.

**Course objectives:**

- ✓ To know the terminology of Physical examination.
- ✓ To know Discussing treatment.
- ✓ To know the research article.

**Skills:**

- ✓ To build up Communications skill.
- ✓ How to do Case presentation.
- ✓ Know the Medical abbreviations.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Glendinning .H.E. & Howard .R, (2007), Professional English in use. Cambridge: Cambridge university press.
2. English grammar by Betty Schampfer , 3rd edition
3. Essential grammar in use by Roymound Murphy ,3rd edition ,2007
4. New Inter change book one ,by Jack C Richards ,students text book ,2008

**Diagnostic Microbiology**

<b>Diagnostic Microbiology</b>				
<b>Discipline</b>		<b>Para Clinic</b>		
<b>Department</b>		<b>Microbiology</b>		
<b>Subject</b>		<b>Diagnostic Microbiology</b>		
<b>Course code</b>		<b>ML414</b>		
<b>Course pre requisite</b>		<b>General Microbiology</b>		
<b>Class</b>		<b>2</b>		
<b>Semester</b>		<b>4</b>		
<b>Credits</b>		<b>4</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>2</b>	Infections, Key concepts	Infection, infectious process, infectious disease, pathogen, non pathogen, opportunistic infections.
<b>2</b>	<b>2</b>	<b>2</b>	Pathogenicity, Virulence	Pathogenicity, virulence and their importance in disease causing; units of virulence; increment and decrement of virulence and it's importance in vaccine formation.
<b>3</b>	<b>2</b>	<b>2</b>	Microbial Toxins(Exotoxin, Endotoxin)	Toxins, their composition and types, clinical effects and sequelea; differences of exotoxin and endotoxin.
<b>4</b>	<b>2</b>	<b>2</b>	Course of Infectious disease	Sources of an infection, means of transmission to susceptible persons, portal of entry and exit. Adhesion and invasion into host cells, host cell destruction, and immune evasion of bacteria.
<b>5</b>	<b>2</b>	<b>2</b>	Clinical forms, and related terms	Acute versus chronic infections, latent and subacute infection; secondary, recurrent and reinfection; sporadic, endemic, epidemic, and pandemic infections.

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<b>6</b>	<b>2</b>	<b>2</b>	Microbial Genetics	Genetic exchange and bacterial diversity; conjugation, transduction, transformation and trasposons and their mode of exchange.
<b>7</b>	<b>2</b>	<b>2</b>	Antimicrobial Therapy	Role of antimicrobials in bacterial therapy; mechanisms of action and common types.
<b>8</b>	<b>2</b>	<b>2</b>	Introduction to disease causing bacteria; Staphylococcus	A brief introduction and diagram of disease causing bacteria: Gram positive, gram negative, acid-fast, and mycoplasma infections; Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis of staphylococci
<b>9</b>	<b>2</b>	<b>2</b>	Streptococcus	Introduction, occurrence, morphology, Classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>10</b>	<b>2</b>	<b>2</b>	Neisseria	Introduction, occurrence, morphology, classification, virulence factors, antigenic Structure, pathogenesis, lab diagnosis.
<b>11</b>	<b>2</b>	<b>2</b>	Enteric Gram –ve bacilli	Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>12</b>	<b>2</b>	<b>2</b>	Salmonella and Shigella	Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>13</b>	<b>2</b>	<b>2</b>	Vibreo cholera, Compylobacter	Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>14</b>	<b>2</b>	<b>2</b>	H.pylori, orynebacterium ,Bordetella,Hemophilus Influanza	Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>15</b>	<b>2</b>	<b>2</b>	Brucella, Mycobacterium	Introduction, occurrence, morphology, classification, virulence factors, antigenic structure, pathogenesis, lab diagnosis.
<b>16</b>	<b>2</b>	<b>2</b>	Applied microbiology: Role of bacteriology laboratory	Understanding of clinical bacteriology lab's roles/objectives; different steps of the micro lab; evolution of bacteriology lab needs.

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1 Lecture = 50 minutes  
Hour per week = 4  
Total credit = 4

**Goal:**

After completion of this course students will be able to:

- ✓ Describe morphology and physiology of microorganisms and infections.
- ✓ Identify different kinds of microorganisms, isolation and culture of microorganisms

**Course objectives:**

- ✓ To know the Infections, Key concepts.
- ✓ To know the Antimicrobial susceptibility test.
- ✓ To know the morphology and diagnostic methods of some common gram positive and gram negative bacteria.
- ✓ To know Applied microbiology: Role of bacteriology laboratory

**Skills:**

- ✓ How to do the antimicrobial susceptibility test.
- ✓ How to do some biochemical test of bacteria.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Diagnostic microbiology laboratory manual – Price Green
2. Microbiology, 2nd Edition (Lippincott's Illustrated Reviews): Richard A. Harvy, Pamela C. Champe, Bruce D. Fisher
3. Clinical microbiology made ridiculously simple, 3rd edition: Mark Gladwin, M.D; Bill Trattler, M.D.
4. Practical handbook of Microbiology, 2nd edition: Edited by Emanuel Goldman and Lorrence H. Green
5. Baily Scott Diagnostic Microbiology, 14 th edition.patricia, Elsevier (Mosby).

**Hematology 1 (Principles)**

<b>Hematology 1 (Principles)</b>					
<b>Discipline</b>		<b>Medical Laboratory Technology</b>			
<b>Department</b>		<b>Medical Technology</b>			
<b>Course Title</b>		<b>Fundamentals in Hematology and Hemostasis</b>			
<b>Course code</b>		<b>ML418</b>			
<b>Prerequisites</b>		<b>Medical Cellular and Molecular Biology Physiology</b>			
<b>Class</b>		<b>2</b>			
<b>Semester</b>		<b>4</b>			
<b>Discipline</b>		<b>Medical Laboratory Technology</b>			
<b>Number of Credits</b>		<b>4</b>		<b>Lecture</b>	<b>2</b>
				<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>2</b>	<b>2</b>	<b>Introduction</b>	Definition of Blood Blood functions	
<b>2</b>	<b>2</b>	<b>2</b>	<b>Some importance blood physical characteristics</b>	Hematocrit, Blood viscosity, Blood osmotic pressure, ESR, Blood volume	
<b>3</b>	<b>2</b>	<b>2</b>	<b>Capillary collection, WBC Differential</b>	Types of cell Granulocyte ( neutrophile, basophile, eosinophile) Agranulocyte (lymphocyte, monocyte) RBC	
<b>4</b>	<b>2</b>	<b>2</b>	<b>Hematopoiesis (Normoblastic maturation and kinetic)</b>	Myeloid line (Erythropoiesis, thrombopoiesis, leukopoiesis) Lymphoid line (B-lymphocyte, T-lymphocyte)	
<b>5</b>	<b>2</b>	<b>2</b>	<b>Erythropoiesis</b>	CFU-E, pronormoblast, basophilic normoblast, polychromatophilic normoblast, orthochromatic normoblast, reticulocyte, erythrocyte	

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				RBC metabolism and structure RBC abnormality (IDA, sickle cell anemia, thalacemia, megaloblastic anemia, G6PD deficiency , ...)
<b>6</b>	<b>2</b>	<b>2</b>	<b>Hemoglobin</b>	Hemoglobin synthesis Hb function Hb measurement using colorimetric and non colorimetric methods
<b>7</b>	<b>2</b>	<b>2</b>	<b>Hemoglobin</b>	Factors affecting Hb synthesis Type of Hb chains, abnormal Hb and hemoglobinopathies, Hemoglobin derivatives
<b>8</b>	<b>2</b>	<b>2</b>	<b>Intro to making blood smear,practice venipuncture</b>	Smear quality,blood smear staining,cellular estimates.cellular identification
<b>9</b>	<b>2</b>	<b>2</b>	<b>Plasma protein</b>	Types of plasma protein Separating of plasma proteins (salting out, electrophoresis, immunoelectrophoresis, cohn method, ultracentrifugation) Study of specific plasma proteins ( albumin, haptoglobuline, transferin, ceruloplasmin, lipoproteins)
<b>10</b>	<b>2</b>	<b>2</b>	<b>Capillary collection &amp; venipuncture</b>	Capillary collection(RBC cytochemistry, Differential) Venipuncture(whole blood extraction, Differential)
<b>11</b>	<b>2</b>	<b>2</b>	<b>Hemostasis and coagulation</b>	Definition of hemostasis Stages of hemostasis Hemostatic factors Intrinsic pathway
<b>12</b>	<b>2</b>	<b>2</b>	<b>Hemostasis and coagulation</b>	Extrinsic pathway Common pathway Inhibators of thrombine activity Anticoagulant of cumarine Hemophili A and B
<b>13</b>	<b>2</b>	<b>2</b>	<b>Fibrinolytic system</b>	Lysis of fibrin by plasmin Role of streptokinase Fibrinolytic pathway
<b>14</b>	<b>2</b>	<b>2</b>	<b>Laboratory practice of Blood coagulation and thrombolysis</b>	PT, APTT, TT, INR, CT, BT, retraction time

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<b>15</b>	<b>2</b>	<b>2</b>	<b>Blood PH</b>	Definition of Acid Definition of Bases Buffer system of blood Role of blood buffer system in regulation of blood PH
<b>16</b>	<b>2</b>	<b>2</b>	<b>Blood PH</b>	Role of pulmonary system in regulation of blood PH Role of kidneys in regulation of blood PH Acidosis, Alkalosis
1 Lecture = 50 minutes Hour per week = 4 Total credit = 4				

### GOAL

This course is intended to provide the student with a foundation of the theory and principles of hematology and hemostasis and coagulation in the clinical laboratory setting. Analysis and interpretation of test results as they correlate to clinical diagnosis will be discussed. Hematology Theory and Lab includes a review of general cell morphology with an emphasis on hematopoiesis and bone marrow evaluation. Hematological disease states such as anemia and leukemia are discussed in detail. Hemostasis, thrombosis and disease of the coagulation system are discussed. The course introduces both manual and automated testing in the hematology laboratory. At the end of this course students have to understand and describe basics of blood, its component and its origin and all the issues related to it in measurement

### COURSE OBJECTIVE:

- ✓ Describe and identify normal Hematopoiesis and maturation of bone marrow derived lineage;
- ✓ Understand the principles of common hematology and hemostasis methods;
- ✓ Distinguish between non-malignant hematologic abnormalities and their causes;
- ✓ Utilize quality control and quality assurance techniques common in Hematology and Hemostasis;
- ✓ Compare and contrast the production, structure, function and interaction of all parts the hemostatic system;
- ✓ Evaluate the results of laboratory tests for normal hemostasis and hemostatic disorders.

### SKILLS

After completion of this course students will be able to:

- ✓ Explain the origin of blood cells and articulate the process of erythropoiesis and leucopoiesis as it relates to health and disease.
- ✓ Discuss the coagulation process and its role in maintaining hemostasis.
- ✓ Demonstrate current hematological procedures used to diagnose, monitor and evaluate disorders.

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- ✓ Compare and contrast hematology values under normal and abnormal conditions;
- ✓ Perform and explain principles and procedures of tests to include sources of error and clinical significance of results;
- ✓ Evaluate normal and abnormal cell morphology with associated diseases;
- ✓ Evaluate and assessment situation of hemostasis and coagulation.

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Dacie and lewis practical hematology, eleventh edition, 2011
2. Hematology clinical principles and applications, fourth edition, 2012
3. Hematology in clinical practice, fifth edition, 2010
4. Hematology: A pathophysiologyc approach, 2012
5. Harmening, Clinical Hematology and Fundamentals of Hemostasis,5<sup>th</sup> edition, F.A.Davis, Philadelphia, PA.2009.
6. Andeson’s Atlas of Hematology, 2 edition

Systemic Pathology

<b>Systemic Pathology</b>				
Discipline		Para clinic		
Department		Pathology		
Course Title		Systemic pathology		
Course code		ML417		
Prerequisites		General Pathology		
Class		2		
Semester		4		
Number of Credits		3		
		Lecture	2	
		Practical	1	
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	1	Blood vessels, structure and function of blood vessels, blood pressure regulation, and hypertensive vascular disease	Vascular organization, Endothelial cells Vascular smooth muscle cells, Epidemiology of hypertension, Pathogenesis, Morphology
			Vasculitis and disorders of blood vessel hyperactivity	Noninfectious vasculitis, Infectious vasculitis Raynaud phenomenon, Myocardial vessel vasospasm
2	2	1	Heart ,Overview of heart disease, Heart failure & Ischemic heart disease	Left-side heart failure, Right-side heart failure, Angina pectoris, Myocardial infarction, Chronic ischemic heart disease, and sudden cardiac death
			Hematopoietic and lymphoid systems, red cells disorders	Anemia of blood loss, Hemolytic anemia
3	2	1	Red Cells Disorders	Anemia of diminished erythropoiesis
			White cell disorders	Non-neoplastic disorders of white cells Neoplastic proliferations of white cells

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4	2	1	Bleeding Disorder	Disseminated Intravascular Coagulation Thrombocytopenia, Coagulation disorders
			Lung	Atelectasis, acute respiratory distress syndrome, obstructive versus restrictive pulmonary diseases
5	2	1	Obstructive lung (airway) diseases, Chronic interstitial (restrictive, infiltrative) lung diseases	Emphysema, Chronic bronchitis, Asthma, and Bronchiectasis, Fibrosing diseases, Granulomatous diseases Pulmonary, eosinophilia, Smoking-related interstitial diseases.
			pulmonary infections	Community acquired acute pneumonias, Community acquired atypical pneumonias, Hospital acquired pneumonias, Aspiration pneumonia and lung abscess, Chronic pneumonia, Fungal Infections
6	2	1	Lesions of the upper respiratory tract	Acute infections, Nasopharyngeal carcinoma Laryngeal tumors
			Oral cavity and gastrointestinal tract	Oral inflammatory lesions, Proliferative and Neoplastic lesions, Diseases of Salivary glands
7	2	1	Esophagus	Obstructive and Vascular diseases Esophagitis, Esophageal tumors
			Stomach	Inflammatory disease of the stomach, Neoplastic disease of the stomach
8	2	1	Small and large intestines Appendix	Intestinal obstruction, Vascular disorders of bowel, Diarrheal disease, Inflammatory intestinal disease, Colonic polyps and Neoplastic disease, Acute appendicitis, Tumors of the appendix
			Liver, gallbladder, and biliary tract	Clinical syndromes, Jaundice and Cholestasis, Hepatic encephalopathy
9	2	1	Acute and chronic hepatitis	Viral hepatitis, Autoimmune hepatitis Drug/toxin-mediated injury mimicking hepatitis
			Kidney and its collecting system glomerular disease	Clinical manifestations of renal diseases Mechanisms of glomerular injury and disease, The nephritic and nephrotic syndromes
10	2	1	Urinary out flow obstruction Tumors of the kidney	Renal stones and Hydronephrosis, Oncocytoma, Renal cell carcinoma, Clear cell carcinomas, Papillary renal cell carcinoma, Chromophobe renal cell carcinomas, and Wilms tumor

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			<b>Male genital system and lower urinary tract, Penis, Scrotum, Testis and Epididymis</b>	Malformations, Inflammatory lesions, and neoplasms of the Penis, Cryptorchidism and testicular atrophy, Inflammatory lesions, Vascular disturbances, and Testicular neoplasms
11	2	1	<b>Prostate, Ureter, Bladder, and</b>	Prostitis, Benign prostatic hyperplasia, and Carcinoma of the prostate Ureter pelvic junction obstruction and Retroperitoneal fibrosis, Non-neoplastic and Neoplastic conditions of the urinary bladder
			<b>Urethra Sexually transmitted diseases</b>	Syphilis, Gonorrhoea, Nongonococcal urethritis and cervicitis, Lymph granuloma venereum, Cancroid (soft chancre), Granuloma inguinal, Trichomoniasis, Genital herpes simplex, and Human papillomavirus Infection
12	2	1	<b>Female genital system and breast, vulva &amp; vagina</b>	Vulvitis, Non-neoplastic epithelial disorders, and Tumors of the Vulva, Vaginitis and Malignant neoplasms of the Vagina
			<b>Cervix, Body of uterus</b>	Cervicitis, Endometritis, Adenomyosis, Endometriosis, Abnormal uterine bleeding, and Proliferative lesions of the endometrium and myometrium
13	2	1	<b>Diseases of pregnancy</b>	Ectopic pregnancy, Gestational trophoblastic disease, Preeclampsia/Eclampsia
			<b>Breast &amp; breast tumors</b>	Fibrocystic change, Inflammatory processes, Fibroadenoma, Phyllodes tumor, Intraductal papilloma, and Carcinoma
14	2	1	<b>Endocrine system Pituitary</b>	Hyperpituitarism and pituitary adenomas, Hypopituitarism, Posterior pituitary syndromes
			<b>Thyroid Gland</b>	Hyperthyroidism, Hypothyroidism, Thyroiditis, Graves disease, Diffuse and Multinodular goiter, and Neoplasms of the thyroid
15	2	1	<b>Endocrine pancreas</b>	Diabetes mellitus, Pancreatic neuroendocrine tumors

			<b>Adrenal cortex</b>	Adrenocortical hyperfunction (Hyperadrenalism), Adrenal insufficiency, and Adrenocortical neoplasms
<b>16</b>	<b>2</b>	<b>1</b>	<b>Adrenal medulla, Multiple endocrine neoplasia syndrome</b>	Tumors of the adrenal medulla, Multiple endocrine neoplasia type 1, Multiple endocrine neoplasia type 2
			<b>Skin, acute and chronic inflammatory dermatosis</b>	Urticarial, Acute eczematous dermatitis, Psoriasis, and Infectious dermatosis
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

#### GOAL

The student know the pathology of the different human systems.

#### COURSE OBJECTIVE:

Getting to know and describe physiology, pathophysiology, pathology and diagnostic procedure of disorders and inflammations in various organs.

#### SKILLS

After completion of this course students will be able to know the mechanism of pathological changes in different systems

#### TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

#### EVALUATION:

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

#### Reference

1. Robbins Basic Pathology, last edition

Clinical biochemistry-1

<b>Clinical biochemistry-1</b>				
<b>Discipline</b>		Medical Laboratory Technology		
<b>Department</b>		Medical Technology		
<b>Course Title</b>		Biochemistry		
<b>Course code</b>		ML416		
<b>Prerequisite</b>		General Biochemistry		
<b>Class</b>		2		
<b>Semester</b>		4		
<b>Number of Credits</b>		4		
		<b>Theory</b>	2	
		<b>Practical</b>	2	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
1	2	2	Metabolism of Carbohydrates & Glycolysis	Introduction. Introduction, Reactions, Regulation. Enzymes and CoEnzymes of glycolysis Reversion of Glycolysis. Formation and Fate of Pyruvic acid.
			Citric Acid Cycle	Reactions, Regulation
2	2	2	Citric Acid Cycle	Bioenergetics (Calculation of ATP Moles with Produced in Glycolysis and Citric Acid Cycle from Glucose), Efficiency.
			Electron transport system and oxidative phosphorylation	Mechanisms of the control of Glucose combustion
3	2	2	Hexose Mono Phosphate (HMP) Shunt	Introduction , Regulation, Metabolic Significance

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			(Pentose Phosphate Pathway):	
			Metabolism of Glycogen Glycogenesis: Glycogenolysis:	Introduction, Reactions, Regulation.
4	2	2	Metabolism of Glycogen Glycogenesis: Glycogenolysis:	Regulation of Glycogen Metabolism, Inherited Disorders (Glycogen Storage Diseases or GSDs).
			Metabolism of Galactose: Metabolism of Fructose	Introduction , Metabolic Pathway, Biosynthesis of Lactose Introduction, Metabolic Pathway
5	2	2	Metabolism of Lipids	Introduction, Activation of Fatty Acid, Carnitine and its Role in F.A, Beta Oxidation.
			Formation and Utilization of Ketone Bodies ,Calculation of Energy of Fatty Acids Combustion in the body Biosynthesis of Fatty Acids:	Ketosis or Ketoacidosis Introduction, Biosynthesis of Saturated F. As., Biosynthesis of Unsaturated F. As..
6	2	2	Biosynthesis of Triglycerides Biosynthesis of Phospholipids:	(Triacylglycerols).  Biosynthesis of Glycerophospholipids (Lecithin, Phosphatidyl Serine, Phosphatidyl Ethanolamine, Cardiolipin, Plasmalogens).
			Biosynthesis &Catabolismof Sphingolipids:	Biosynthesis of Sphingosine, Biosynthesis and Catabolism of (Ceramide and Sphingomyeline Glucocerebroside , Galactocerebroside , Sulfatide, Ceramide Lactoside, Ceramide Tri Hexoside and Ganglioside).
7	2	2	Prostaglandins Prostacyclins &Thromboxane's. Leukotriene's (LTs). Control of Fat	(Introduction, Structure, Metabolism and Functions). Chemistry and Functions.

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			Metabolism	
			Role of Liver in Lipid Metabolism.	
8	2	2	Plasma Lipoproteins and their Metabolism	Lipotropic Factors, Role of Adipose tissue in Fat Metabolism, Metabolism of Free Fatty Acids.
			Metabolism of Cholesterol:	Introduction ,Biosynthesis Regulation, Functions of Cholesterol, Transport of Cholesterol.
9	2	2	Metabolism of Proteins and Amino acids:	Introduction, Nitrogen Balance,
			Metabolism of Proteins and Amino acids:	Dissimilation of Amino acids or N-Catabolism of Amino acids [Transamination, Deamination (Oxidative and Non Oxidative)]
10	2	2	Urea Formation in Krebs'-Henseleit (Urea) Cycle,	Biosynthesis, Regulation of Urea Synthesis,
			Urea Formation in Krebs'-Henseleit (Urea) Cycle,	Clinical Significance of Urea
11	2	2	Urea Formation in Krebs'-Henseleit (Urea) Cycle,	Inherited Disorders Associated with Urea Cycle.
			Metabolism of Amino Acids:	Glycine, Creatine and Creatinine , Alanine, Valine, Leucine, Isoleucine , Serine , Methionine
12	2	2	Metabolism of Amino Acids:	Cysteine, Glutamic acid, Glutamine, Aspartic acid, Asparagin , Arginine, Lysine
			Metabolism of Amino Acids:	Ornithine, Citrulline, Histidine ,Tryptophan, Proline, Hydroxy Proline , Phenylalanine, Tyrosine
13	2	2	Metabolism of Pieces which have One Carbon.	Choline, betaine, serine, thymine
			Metabolism of Pieces which have One Carbon.	Purine, methionine, methanol, acetone
14	2	2	Metabolism of Pyrimidine's and Purine	Biosynthesis and Catabolism of Pyrimidine's.

			<b>Metabolism of Pyrimidine's and Purines</b>	<b>Biosynthesis and Catabolism of Purines. Uric acid Metabolism and clinical Disorders of Purines and Pyrimidine's Metabolism</b>
15	2	2	<b>Biosynthesis of DNA.</b>	<b>Biosynthesis of DNA, hydrolysis of DNA</b>
			<b>Biosynthesis of RNA</b>	<b>Biosynthesis of RNA, mRNA, tRNA, rRNA.</b>
16	2	2	<b>Mutation</b>	<b>Silence mutation and non-effective mutation</b>
			<b>Synthesis of Proteins</b>	<b>Initial stage of protein synthesis, Continue stage and end stage of protine synthesis</b>
<p>1 Lecture = 50 minutes Hour per week = 4 Total credit = 4</p>				

### **Goal:**

Describing the metabolism of the macromolecules.

### **COURSE OBJECTIVE:**

Describe metabolism of carbohydrate, lipid and protein, Explain biosynthesis of DNA and RNA, perform relevant biochemical test.

### **COURSE DISCRPTION:**

Described above in the table.

### **SKILLS**

After completion of this course students will be able to:

- ✓ Describe metabolism of carbohydrate, lipid and protein metabolisms and its disorders
- ✓ Explain biosynthesis of DNA and RNA and its disease and disorders
- ✓ Perform relevant biochemical test and experiments and how to assessment it

### **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Harper's biochemistry , 29th edition, 2012
2. Medial biochemistry, second edition, 2006

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3. Lehninger A.L. biochemistry, The molecular basis of cell structure and function, fifth edition, 2008
4. Lubert Stryer Biochemistry ,Fifth edition, 2002
5. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics, the last edition

Third year: First semester

Islamic Studies 5

<b>ISLAMIC STUDIES 5</b>				
<b>Discipline</b>		<b>Religious</b>		
<b>Department</b>		<b>Islamic Studies</b>		
<b>Course Title</b>		<b>Islam &amp; Medical Practice</b>		
<b>Course code</b>		<b>ML501</b>		
<b>Prerequisite</b>		<b>ISLAMIC STUDIES 4</b>		
<b>Academic year</b>		<b>3</b>		
<b>Semester</b>		<b>5</b>		
<b>Number of Credits</b>		<b>1</b>	<b>Theory</b>	<b>1</b>
			<b>Practical</b>	<b>0</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>1</b>			<b>Islam &amp; Medical practice</b>
<b>2</b>	<b>1</b>			<b>General information about Medicines</b>
<b>3</b>	<b>1</b>			<b>Concept of Health and Medicines in Islamic Studies.</b>
<b>4</b>	<b>1</b>			<b>Definition of Health and Sickness</b>
<b>5</b>	<b>1</b>			<b>Importance of Medicines in Islam</b>
<b>6</b>	<b>1</b>			<b>Verses and Hadith related health</b>
<b>7</b>	<b>1</b>			<b>Medicines in Previous Religions.</b>
<b>8</b>	<b>1</b>			<b>Hygiene in Islam</b>
<b>9</b>	<b>1</b>			<b>Rules of Prohibited things in Islams</b>
<b>10</b>	<b>1</b>			<b>Verses and Hadiths related protective procedures.</b>
<b>11</b>	<b>1</b>			<b>Individual and social hygiene</b>
<b>12</b>	<b>1</b>			<b>Harms and prohibition of narcotics and Alcoholic beverages</b>
<b>13</b>	<b>1</b>			<b>Verses and Hadith related to alcoholic beverage prohibition</b>

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<b>14</b>	<b>1</b>			<b>Narcotic protection</b>
<b>15</b>	<b>1</b>			<b>Orders of scholars related use of narcotics</b>
<b>16</b>	<b>1</b>			<b>Health benefits of fasting</b>

1 Lecture = 50 minutes  
Hour per week = 1  
Total credit = 1

**Goal:**

The students should be able to know the relation of medicine to Islam and its importance in Islam.

**Course objectives:**

- ✓ To know the General information about Medicines.
- ✓ To know the Importance of Medicines in Islam.
- ✓ To know the Hygiene in Islam.

**Skills:**

- ✓ To build up Communications skill.
- ✓ How to apply Narcotic protection.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- Written final examination ..... 80%
- Class activity, tests during the semester, attitude in contributing to group work 20%

**✓ References**

1. Quran
2. Hadis

Genetics

<b>Genetics</b>				
<b>Discipline</b>		Basic Science		
<b>Department</b>		Biology		
<b>Course Title</b>		Genetic		
<b>Prerequisite</b>		Medical Cellular and Molecular Biology		
<b>Course code</b>		ML504		
<b>Class</b>		3		
<b>Semester</b>		5		
<b>Number of Credits</b>		2	<b>Theory</b>	2
			<b>Practical</b>	0
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
1	2		Basic structure and function of Gene and chromosome	The Genetic code, Clinical commentary, Osteogenesis Imperfecta Type of DNA,
2	2		Genetic variation	The origin and Detection, type of Mutation
3	2		Molecular consequence of mutation	The hemoglobin disorders, sickle cell Diseases, Thalassemia
4	2		Cause of Mutation	The effects of Radiation on mutation rates, Xeroderma Pigmentosum
5	2		Blood groups	The ABO blood groups, Rh System
6	2		Detecting variation at the DNA level	Southern Blotting and restriction fragment analysis, Single nucleotide polymorphisms
7	2		Autosomal dominant and recessive Inheritance	Gregor Mendel's Contribution, The concept of phenotype, Cystic Fibrosis, Postaxial polydactyly
8	2		Autosomal Recessive inheritance	Characteristic, Achondroplasia
9	2		New Mutation	Germline Mosaicism, retinoblastoma, Huntington disease, Neurofibromatosis
10	2		Pleiotropy	Marfan Syndrome, and example

11	2		Sex-linked and nontraditional mode of inheritance	X inactivation, Hemophilia A, Duchenne Muscular dystrophy
12	2		Mitochondrial inheritance	Genetic imprinting
13	2		The fragile x Story	Structure and Types
14	2		Clinical Cytogenetic	Human disease
15	2		Abnormalities	Polyploidy, Down Syndrome, trisomy 18
16	2		Sex chromosome Aneuploidy	Monosomy, XX Males, XY Females, Trisomy X, 47XYY Syndrome
<p>1 Lecture = 50 minutes Hour per week = 2 Total credit = 2</p>				

### GOAL:

This course covers principles of prokaryotic and eukaryotic cell genetics. Emphasis is placed on the molecular basis of heredity, chromosome structure, patterns of Mendelian and non-Mendelian inheritance, evolution, and biotechnological applications and genetic disorders.

### COURSE OBJECTIVE:

The students should be able to:

- ✓ Understand the structure of DNA and RNA ,
- ✓ Mutation and Clinical Cytogenetic, Abnormalities
- ✓ Sex chromosome Aneuploidy
- ✓ To introduce students with basic concept of human genetics
- ✓ To equip the students with instrumentation involved in human genetics

### SKILLS

Upon completion, students should be able to recognize and describe genetic phenomena and demonstrate knowledge of important genetic principles and disorders.

### TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### EVALUATION:

- ✓ Written final examination 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### Reference

1. Essential of Medical Genetics(Ferguson) latest edition
2. Emery, S Element or medical Genetic. Latest

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3. Molecular Genetics (G.H.SACK),Latest Edition

**Clinical biochemistry-2**

<b>Clinical Biochemistry-2</b>				
<b>Discipline</b>		<b>Medical Laboratory Technology</b>		
<b>Department</b>		<b>Medical Technology</b>		
<b>Course Title</b>		<b>Biochemistry</b>		
<b>Course code</b>		<b>ML516</b>		
<b>Prerequisite</b>		<b>Clinical Biochemistry 1</b>		
<b>Class</b>		<b>3</b>		
<b>Semester</b>		<b>5</b>		
<b>Number of Credits</b>		<b>4</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>2</b>	<b>Principles and basic methods of automation</b>	Photometer, flame photometer, electrolyte analyzer, PCR
<b>2</b>	<b>2</b>	<b>2</b>	<b>Principles of basic methods</b>	Electrophoresis, Chromatography
<b>3</b>	<b>2</b>	<b>2</b>	<b>Immunoassay</b>	Different methods, principle and applications
<b>4</b>	<b>2</b>	<b>2</b>	<b>Liver function</b>	Bile pigment metabolism and bile salt.
<b>5</b>	<b>2</b>	<b>2</b>	<b>Acid base balance</b>	Blood gas analysis
<b>6</b>	<b>2</b>	<b>2</b>	<b>Renal function</b>	Renal function test and renal clearance test.
<b>7</b>	<b>2</b>	<b>2</b>	<b>Lipoprotein metabolism</b>	Introduction of lipoprotein, HDL, VLDL, LDL, IDL
<b>8</b>	<b>2</b>	<b>2</b>	<b>Gastric analysis</b>	Composition of gastric juice, concepts of free and bound acids, gastric acid secretions stimulation.

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9	2	2	<b>Enzymes clinical importance</b>	SGOT, SGPT, ALP, ACP, CK-MB,LDH, Lipase, Amylase
10	2	2	<b>Cardiac profile</b>	Troponin I, Troponin T, Myoglobin, CK-MB, LDH
11	2	2	<b>Overview of some inborn errors of metabolism</b>	Maple syrup urine disease, alkaptun uria, Albinism, niemann pick, goucher disease, ...
12	2	2	<b>Diagnostic usefulness of recombinant DNA technology</b>	Definition of recombinant DNA technology, Defects arising from genetic mutations in familial hypercholestermia, cystic fibrosis, amino acids disorders.
13	2	2	<b>Diagnostic usefulness of recombinant DNA technology</b>	Organic acidurias and galactosmia and fructose intolerance.
14	2	2	<b>Biochemistry of cancer</b>	Etiology of cancer, mutagens, carcinogens
15	2	2	<b>Biochemistry of cancer</b>	Selected tumor markers, alpha feto proteins CEA.
16	2	2	<b>Biochemistry of cancer</b>	Tumor markers in myeloma, bence jones proteins, beta-2-microglobulin , PSA, beta-HCG, VMA

1 Lecture = 50 minutes  
Hour per week = 4  
Total credit = 4

**GOAL:**

Describing some specific clinical test(LFT,KFT..)and biochemistry of cancer.

**COURSE OBJECTIVE:**

Describe liver and liver function test, renal function test, Lipid profile, clinical enzyme and their diagnostic importance, blood gas analysis, gastric analysis, cardiac profile, biochemistry of cancer and cancer marker, perform relevant test.

**SKILLS**

After completion of this course students will be able to:

- ✓ Describe any assessment method in diagnostic field;
- ✓ Describe which compounds will rise or reduce in disorders;

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- ✓ Perform any experiments relevant to blood gas analysis
- ✓ Perform relevant biochemical test and experiments in various disorders and how to assessment it;
- ✓ Distinguish various tumor markers in cancers

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Harper's biochemistry , 29th edition, 2012
2. Medial biochemistry, second edition, 2006
3. Lehninger A.L. biochemistry, The molecular basis of cell structure and funciton, fifth edition, 2008
4. Lubert Stryer Biochemistry ,Fifth edition, 2002
5. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics, the last edition

Behavioral sciences

<b>Behavioral sciences</b>				
<b>Discipline</b>				
<b>Department</b>		<b>Behavioral science and Health education</b>		
<b>Course Title</b>		<b>Behavioral science</b>		
<b>Course code</b>		<b>ML505</b>		
<b>Prerequisite</b>		<b>None</b>		
<b>Class</b>		<b>3</b>		
<b>Semester</b>		<b>5</b>		
<b>Number of Credits</b>		<b>1</b>		
		<b>Theory</b>	<b>1</b>	
		<b>Practical</b>	<b>0</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>1</b>		<b>Communication for health education</b>	Process of communication, message, sender, receiver, channels of communication( interpersonal communication, mass media, traditional or folk media)
<b>2</b>	<b>1</b>		Type of communication	Didactic method, Socratic method, verbal and non verbal communication, formal and informal communication, visual communication, telecommunication and internet, barriers of communication
<b>3</b>	<b>1</b>		Health communication	Functions of health communication: information, education, motivation, persuasion, counseling, raising morals, health development, organization
<b>4</b>	<b>1</b>		Health education	Definitions, Alma Ata declaration, health education and behavior, changing concepts, aims and objectives, role of health care provider, approach to health education: regulatory approach, service approach, health education approach, primary health care approach, health education versus propaganda

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5	1		Models of health education	Medical model , motivation model , social intervention model
6	1		Contents of health education	Human biology , nutrition ,hygiene , family health , disease prevention and control , mental health , prevention of accidents , use of health services
7	1		Principles of health education	Credibility , interest , participation , motivation , comprehension , reinforcement , learning by doing , known to unknown , setting an example , good human relations , feedback , leaders
8	1		Practice of health education	Audiovisual aids: auditory aids , visual aids , combined A-V aids , methods in health education , individual approach , group approach : chalk and talk (lecture), flipcharts , flannelgraph , exhibits , demonstrations
9	1		Group discussion	Definition , principles , limitations , panel discussion , symposium , workshop , role playing , conferences and seminars ,
10	1		Mass approach – Education of the general public	Mass media , television , radio , internet , newspapers , printed material, direct mailing , posters , billboards and sign , health museums and exhibitions , folk media , administration and organization
11	1		Information about infectious diseases and controls	Infectious diseases , incubation period ,quarantine , infective period , fomites , carrier , vector , epidemic , endemic , sporadic , epizootic general principles of control of Infectious diseases ; notification , isolation ,immunization , health education , disinfection
12	1		Communicable diseases and prevention	Malaria : patient care , prevention , Tuberculosis : prevention and health education , acute respiratory illness : home care , health education ,Leprosy : prevention and health education , viral hepatitis: prevention and health education
13	1		Communicable diseases and prevention	Amoebic dysentery : health message , prevention , Giardiasis: health education and prevention , cholera : health education , prevention , dehydration therapy in pediatrics and adult , how to make ORS at home , leishmania , trachoma : prevention

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				and health education ,
<b>14</b>	<b>1</b>		Common problems of new borns and health education regarding them	Cradle cape , diaper rash , common cold , simple swelling of the scal , bleeding into the scal ,fracture , fever , low birth weight , hypothermia vitamin A deficiency,
<b>15</b>	<b>1</b>		Common problems of new borns and Mental health	Simple jaundice and abnormal jaundice : healt education , prevention, Neonatal tetanus : prevention and health messages , Mental health and mental disorders ,health messages , drug abuse and health messages
<b>16</b>	<b>1</b>		Dental health , personal and family hygiene and health messages	Important of healthy teeth , personal and family hygiene , health messages for prevention of infections , health messages for initial nutrition of newborns and weaning , for pregnant women , for dehydration of kids , intestinal parasites , vaccination ,

1 Lecture = 50 minutes  
Hour per week = 1  
Total credit = 1

**Goal:**

The students will learn about health education and communication, when face to health related problems how to change their behavior according the problems and how to find healthy behavior that not face to those problems in future.

**Course objectives:**

- ✓ To know the Communication for health education.
- ✓ To know the Type of communication.
- ✓ To know the Models of health education.

**Skills:**

- ✓ To build up Communications skill.
- ✓ To know the Communicable diseases and prevention..

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

## **References:**

1. Park's textbook of prevention and social medicine , 19th edition, Feb. 2014 ,Delhi India, k. PARK , M.B.B.S. , M.S
2. MOPH ( ministry of public health Afghanistan)
3. UNICEF State of world's children 1989
4. WHO ( World health organization), Public health papers, WHO offset publication NO.7
5. Education for health a manual on health education and primary health care.
6. Dr. Abdul Mateen Edrak

Diagnostic Hematology

<b>Diagnostic Hematology</b>					
Discipline		Medical Laboratory Technology			
Department		Medical Technology			
Course Title		Diagnostic Hematology			
Course code		ML518			
Prerequisites		Hematology 1			
Class		3			
Semester		5			
Number of Credits		3		Lecture	2
				Practical	1
Weeks	Hours		Topics	Demonstration	
	Lecture	Practical			
1	2	1	Anemia	<ul style="list-style-type: none"> <li>❖ Definition</li> <li>❖ Pathphysiology</li> <li>❖ Pathogenesis</li> <li>A- Normal erythropoiesis</li> <li>B- Pathogenesis of anemia</li> </ul>	
2	2	1	Anemia	<p><u>a- Anemia caused by impaired production of erythrocyte by bone marrow.</u></p> <ol style="list-style-type: none"> <li>1- Erythropoietin deficiency</li> <li>2- Quantitative deficiency of hematopoietic stem cells and/or committed erythroid progenitors.</li> <li>3- Impaired ability of erythroid progenitors to respond to erythropoietin.</li> <li>4- Disorders characterized by impaired DNA Synthesis : Megaloblastic anemia.</li> <li>5- Impaired hemoglobin synthesis: Disorders characterized by diminished heme synthesis.</li> <li>6- Impaired hemoglobin synthesis:</li> </ol>	

				<p>Disorders characterized by impaired globin synthesis – thalassemia.</p> <p>7- 2Ineffective erythropoiesis</p> <p><u>b- Anemia caused by accelerated destruction: consumption / or loss of circulating erythrocytes.</u></p> <p>1- Hemolytic anemias caused by intrinsic red cell membrane defect.</p> <p>2- Hemolytic anemias caused by intrinsic red blood cells enzyme -pathyes.</p> <p>3- Hemolytic anemias caused by hemoglobin variants with reduce solvability or protein instability.</p> <p>4- Hemolytic anemias caused abnormalities extrinsic to red blood cells.</p> <p>5- Blood loss.</p> <p>6- Dilutional pseudoanemia.</p>
3	2	1	Anemia	<p>❖ <b>Clinical manifestations</b></p> <p>1- Physiologic compensatory mechanism.</p> <p>2- Clinical manifestation of chronic anemia.</p> <p>3- General clinical manifestations of acute development of anemia from blood loss or hemolysis.</p> <p>4- Diseases of other body systems that can cause or be associated with anemia.</p> <p>❖ <b>Diagnosis</b></p> <p>1- Laboratory evaluation</p> <p>Differential diagnosis</p>
4	2	1	iron deficiency anemia	<p><b>Definition:</b></p> <p><b>Normal iron metabolism</b></p> <p>a- Iron requirement</p> <p>b- Dietary sources of iron</p> <p>c- Absorption</p> <p>d- Transport of iron</p> <p>e- Incorporation of iron in erythroid precursors</p> <p>f- Storage of iron</p> <p>❖ <b>Causes of iron deficiency anemia</b></p> <p>❖ <b>Clinical manifestations</b></p> <p>❖ <b>laboratory features</b></p> <p>a- Peripheral blood examination</p> <p>b- Red blood cell indices</p>

				<ul style="list-style-type: none"> <li>c- Bone marrow examination</li> <li>d- Serum ferritin</li> <li>e- Serum iron , TIBC and percent transferring saturation</li> <li>f- Solvable transferring receptor assay</li> <li>g- Free erythrocyte protoporphyrin</li> </ul>
5	2	1	Megaloblastic anemia	<ul style="list-style-type: none"> <li>❖ <b>Definition</b></li> <li>❖ <b>Normal vit B12 metabolism</b> <ul style="list-style-type: none"> <li>a- Source of vit B12</li> <li>b- Absorption of vit B12</li> <li>c- Transport of vit B12</li> <li>d- Storage sites</li> <li>e- Functions of vit B12</li> </ul> </li> <li>❖ <b>Normal folate metabolism</b> <ul style="list-style-type: none"> <li>a- Source of folate</li> <li>b- Absorption</li> <li>c- Transport</li> <li>d- Storage</li> <li>e- Function of folate</li> </ul> </li> <li>❖ <b>General morphological feature of megaloblastic anemia</b> <ul style="list-style-type: none"> <li>1- Peripheral blood <ul style="list-style-type: none"> <li>a- Red cells</li> <li>b- White cells</li> <li>c- Platelets</li> </ul> </li> <li>2- Bone marrow</li> </ul> </li> </ul> <p>Causes of megaloblastic anemia</p> <ul style="list-style-type: none"> <li>1-Deficiency of folate <ul style="list-style-type: none"> <li>a- a- Causes of folate deficiency</li> <li>b- Clinical feature</li> <li>c- Laboratory feature</li> </ul> </li> </ul>
6	2	1	Megaloblastic anemia	<ul style="list-style-type: none"> <li>1- <b>Deficiency of vitB12</b> <ul style="list-style-type: none"> <li>d- Causes of vitB12 deficiency</li> <li>e- Clinical feature</li> <li>f- Laboratory feature</li> </ul> </li> </ul>
7	2	1	Hemolytic anemia	<ul style="list-style-type: none"> <li>A- <b><u>Autoimmune hemolytic anemia</u></b> associate with IgG auto antibodies <ul style="list-style-type: none"> <li>1- Epidemiology</li> <li>2- Pathobiology</li> <li>3- Clinical manifestations</li> <li>4- Diagnosis</li> </ul> </li> </ul>

				<ul style="list-style-type: none"> <li>a- History</li> <li>b- Physical examination</li> <li>c- Laboratory finding</li> </ul>
8	2	1	<b>Hemolytic anemia</b>	<p>B- <b>Autoimmune hemolytic anemia</b> associated with IgM antibodies: cold agglutinin disease</p> <ul style="list-style-type: none"> <li>1- Epidemiology and definition</li> <li>2- Path physiology</li> <li>3- Clinical manifestation</li> <li>4- Diagnosis</li> </ul>
9	2	1	<b>Hereditary spherocytosis</b>	<p>❖ <b>hereditary spherocytosis</b></p> <ul style="list-style-type: none"> <li>1- <u>Etiopathogenesis</u> <ul style="list-style-type: none"> <li>a- The basic lesion</li> <li>b- Red cells destruction by spleen</li> </ul> </li> <li>2- <u>Inheritance</u></li> <li>3- <u>Clinical features</u></li> <li>4- <u>Laboratory features</u> <ul style="list-style-type: none"> <li>a- Examination of peripheral blood</li> <li>b- Bone marrow examination</li> <li>c- Osmotic fragility test</li> <li>d- Autohemolysis test</li> <li>e- Acidified glycerol</li> <li>f- Hypertonic cry hemolysis test</li> <li>g- Eosin -5- maleimide binding test(EMA)</li> <li>h- Identification of deficient cytoskeletal protein</li> </ul> </li> <li>5- <u>Diagnosis of hereditary spherocytosis</u></li> </ul>
10	2	1	<b>Red cells metabolism disorders</b>	<ul style="list-style-type: none"> <li>1- <b>Normal red cells metabolism</b> <ul style="list-style-type: none"> <li>1- Glycolysis</li> <li>2- Pentose phosphate pathways and glutathione metabolism</li> </ul> </li> <li>2- <b>Red cells metabolism disorders</b> <ul style="list-style-type: none"> <li>A- Defect in the pentose phosphate pathways and glutathione metabolism <ul style="list-style-type: none"> <li>1- G6PD deficiency <ul style="list-style-type: none"> <li>a- Epidemiology</li> <li>b- Path physiology</li> <li>c- Clinical manifestation</li> <li>d- Diagnosis</li> </ul> </li> <li>2- Defect in glutathione metabolism</li> </ul> </li> <li>B- Defect in glycolysis <ul style="list-style-type: none"> <li>1- Pyruvate kinase deficiency <ul style="list-style-type: none"> <li>a- Epidemiology</li> <li>b- Path physiology</li> <li>c- Clinical manifestations</li> </ul> </li> </ul> </li> </ul> </li> </ul>

				d- Diagnosis
11	2	1	Hemoglobinopathies	<p>❖ <b>Hereditary disorders of hemoglobin</b></p> <p><b><u>Classification</u></b></p> <p>a- Hemoglobinopathies</p> <p>b- Thalassemias</p> <p>c- Hereditary persistence of foetal hemoglobin</p> <p>A- Hemoglobinopathies the thalassemias</p> <p>1- Definition</p> <p>2- Path physiology</p> <p>- Genetics</p> <p>- Molecular defects</p> <p>- Path physiology</p> <p>3- Clinical manifestations</p> <p>a- <math>\alpha</math> – thalassemias</p> <p>b- <math>\beta</math> – thalassemias</p> <p>4- Diagnosis</p> <p>a- <math>\alpha</math> – thalassemias</p> <p>b- <math>\beta</math> - thalassemias</p> <p>B- Sickle cell disease and associated hemoglobinopathies</p> <p>A - Sickle cell disease</p> <p>1- Definition</p> <p>2- Epidemiology</p> <p>3- Pathobiology</p> <p>4- Clinical manifestations</p> <p>5- Diagnosis</p>
12	2	1	Methemoglobinemia	<p>C- Methemoglobinemia</p> <p>1- Definition</p> <p>2- Path physiology</p> <p>- Congenital methemoglobinemia</p> <p>1- Epidemiology</p> <p>2- Path physiology</p> <p>3- Clinical manifestations</p> <p>4- Diagnosis</p> <p>D - Unstable hemoglobin</p> <p>1- Clinical manifestation and diagnosis</p>
13	2	1	Bone marrow	<p>❖ <b>Importance of bone marrow examination</b></p> <p>❖ <b>Indication of bone marrow aspiration</b></p> <p><b>Performing a bone marrow aspiration</b></p>

				<ol style="list-style-type: none"> <li>1- puncture of the ilium</li> <li>2- puncture of the sternum</li> <li>3- puncture of spinous processes</li> <li>4- comparison of different site for bone marrow puncture</li> <li>5- marrow puncture needles</li> <li>6- preparing films from bone marrow aspirates</li> <li>7- examination of aspirated bone marrow</li> <li>8- differential cell counts on aspirated bone marrow</li> <li>9- reporting bone marrow aspirated film</li> </ol>
14	2	1	<b>Percutaneous trephine biopsy of the bone marrow</b>	<ol style="list-style-type: none"> <li>1- complications of bone marrow biopsy</li> <li>2- processing of bone marrow trephine biopsy specimens</li> <li>3- staining of sections of bone marrow trephine biopsy specimens</li> </ol>
15	2	1	<p><b>Intro to Leukemia</b></p> <p><b>Immunohistochemistry, Cytochemistry, flow cytometry</b></p> <p><b>Acute lymphocytic leukemia</b></p>	<p>❖ <b>Diagnosis and classification</b></p> <ol style="list-style-type: none"> <li>1- predisposing factors</li> <li>2- mechanism of oncogenesis in acute leukemias</li> </ol> <p>❖ <b>Acute lymphoblastic leukemia</b></p> <ol style="list-style-type: none"> <li>1- clinical features</li> <li>2- classification</li> <li>3- laboratory features             <ol style="list-style-type: none"> <li>a- peripheral blood examination</li> <li>b- bone marrow examination</li> <li>c- cytochemistry</li> <li>d- cytogenetic analysis</li> </ol> </li> <li>4- differential diagnosis of ALL</li> <li>5- Prognostic factor in ALL</li> </ol>
16	2	1	<b>Acute myeloid leukemia</b>	<p>❖ <b>Acute myeloid leukaemia</b></p> <ol style="list-style-type: none"> <li>1- Clinical features</li> <li>2- Classification</li> <li>3- Laboratory features of AML             <ol style="list-style-type: none"> <li>a- Peripheral blood examination</li> <li>b- Bone marrow examination</li> <li>c- Cytochemistry</li> <li>d- Cytogenetic analysis</li> </ol> </li> <li>4- Prognostic factors in AML</li> <li>5- Differential diagnosis</li> </ol>

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

## **GOAL**

After completion of this course students able to recognition of blood diseases and understanding the basics of blood and disorders and diagnostic approach of them by routine and molecular pathology procedure.

## **COURSE OBJECTIVE:**

The students should be able to know:

- ✓ The different types of anemia;
- ✓ How to distinguish anemias from each other;
- ✓ The red cell metabolism and hemoglobinopathies;
- ✓ Disorders of WBC and leukocytopathies;
- ✓ Etiology of blood disorders
- ✓ How to collection bone marrow samples;

## **SKILLS**

After completion of this course students will be able to:

- ✓ Perform hematology techniques procedure;
- ✓ Know which tests need to diagnose blood and bone marrow disorders;
- ✓ Detect abnormal cells;
- ✓ Perform genetic tests to diagnose blood disorders;
- ✓ Performs tests on bone marrow samples.

## **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

## **EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

## **Reference**

1. Dacie and Lewis practical hematology, eleventh edition, 2011
2. Andeson's Atlas of Hematology, 2 edition
3. Hematology clinical principles and applications, fourth edition, 2012
4. Hematology in clinical practice, fifth edition, 2010
5. Color Atlas of Hematology an illustrated field Guide based on proficiency testing.
6. Harmening, Clinical Hematology and Fundamentals of Hemostasis, 5<sup>th</sup> edition, F.A. Davis



**Cytology and Cytotechnology**

<b>Cytology and cytotechnology</b>				
<b>Discipline</b>		Allied Health science		
<b>Department</b>		Histology		
<b>Course Title</b>		Cytology and Cytotechnology		
<b>Course code</b>		ML506		
<b>Prerequisite</b>		Systemic Pathology		
<b>Class</b>		3		
<b>Semester</b>		5		
<b>Number of Credits</b>		3		
		<b>Theory</b>	2	
		<b>Practical</b>	1	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
1	2	1	Cell morphology and functions	Lining membrane epithelium, stratified epithelium, Squamous epithelium and Columnar epithelium
2	2	1	Cell morphology and functions	Epithelium serving reproductive function, Miscellaneous epithelium, Various cells seen in cytological preparations
3	2	1	Sampling and fixation	Collection of samples and processing, Cytological fixatives and fixation
4	2	1	Body fluids	Method of collection and transport, macroscopic and microscopic of Ascitic fluid, pleural fluid, and synovial fluid with special reference to cytology, Collection and preparation of fluid sediment for cytological examination.
5	2	1	Gynecological cytology	Histology and cytology of epithelium of female genital tract during the child bearing age, Cells originating from the normal squamous epithelium of cervix, vagina and Squamocolumnar junction

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6	2	1	Gynecological cytology	Endocervical epithelium, Cells originating from normal Endometrial, Endometrial smears in women wearing intra uterine devices, cells other than epithelia in normal smears
7	2	1	Gynecological cytology	Normal vaginal floras, Cyclic changes in vaginal smears, Basic cytological pattern of menopause, early, crowded and Atrophic menopause.
8	2	1	Genitourinary cytology	Importance of physiologic cytology of prepubertal females. Vaginal smear at ovulation time, Preparation and fixation of vaginal and cervical smears for cytology, Hormonal evaluation of vaginal smears
9	2	1	Genitourinary cytology	Papanicolaou staining-principles and staining procedures, Maygrunwald staining-principles and staining procedures
10	2	1	Excretory system	Cytology of normal urine, voided urine and catheterized urine. Inflammatory process in the lower urinary tract, Bacterial, fungal and viral infections and associated changes.
11	2	1	Excretory system	Cytological changes in bladder epithelium due to therapy, Collection of urine, Bladder irrigation, urine collection after prostatic massage, screening of urinary sediment, cytology of urinary tract in inflammation and malignancy
12	2	1	Respiratory Tract	The squamous epithelium, Respiratory epithelium and their cytology, Non epithelial cells of respiratory tract, Foreign materials in sputum, Benign abnormalities of respiratory epithelium, squamous epithelium and Squamous metaplasia,
13	2	1	Respiratory Tract	Cytology in malignant conditions, Preparation and fixation of sputum smears for cytology and preparation
14	2	1	Gastrointestinal cytology	Gastrointestinal Brushing and lavage, Cytological sampling from esophagus, stomach and duodenum, occult blood in stool, Collection of body fluids and anticoagulants used

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<b>15</b>	<b>2</b>	<b>1</b>	<b>Cancer cells</b>	<b>Morphologic characters of cancer cells, Morphologic difference between benign and malignant cells</b>
<b>16</b>	<b>2</b>	<b>1</b>	<b>Aspiration cytology</b>	<b>Fine Needle Aspiration Cytology (FNAC)</b>
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

**Goal:**

This course is designed to acquaint the student with the cytological aspects pertaining to specimens obtained from the various parts of the body. This will include the way how to process the specimen, normal cytology as well as changes associated with malignancy and other disease processes.

**COURSE OBJECTIVE:**

This course is designed to acquaint the student with the cytological aspects pertaining to specimens obtained from the various parts of the body. This will include the way how to process the specimen, normal cytology as well as changes associated with malignancy and other disease processes.

**SKILLS:**

- Upon completion of this course, students will be able to:
- ✓ Collection and fixation of various cell and fluid samples;
  - ✓ How to staining samples and fluids;
  - ✓ Doing of various experiments on cell and fluid samples;
  - ✓ Can to distinguish pathologic cells of normal cells.

**TEACHING AND LEARNING STRATEIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Diagnostic Cytology and Histopathological basis.Vol 1.E.G.Koss

Parasitology

Parasitology				
<b>Discipline</b>		<b>Para clinic</b>		
<b>Department</b>		<b>Microbiology</b>		
<b>Subject</b>		<b>Parasitology</b>		
<b>Course code</b>		<b>ML507</b>		
<b>Course requisite</b>		<b>Bacteriology</b>		
<b>Class</b>		<b>3</b>		
<b>Semester</b>		<b>5</b>		
<b>Number of Credits</b>		<b>4</b>		
		<b>Theory</b>	<b>2</b>	
		<b>Practical</b>	<b>2</b>	
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	2	Introduction to parasitology; host and parasite relationships; Nomenclature	History and Impact of parasitic infections on human health; Role of colonial empires on development of parasitology; Neglected tropical diseases.
2	2	2	Protozoans: Entameba histolytica	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
3	2	2	Giardia; Trichomonas	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
4	2	2	Leishmania	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
5	2	2	Trypanosoma	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
6	2	2	Blantidium coli; Plasmodium	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
7	2	2	Plasmodium	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.

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8	2	2	Plasmodium; Isospora	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
9	2	2	Toxoplasma	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
10	2	2	Cryptosporidium	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
11	2	2	Introduction to helminths; platyhelminths, nemathelminths	History and Impact of parasitic infections on human health; Neglected tropical diseases; types of parasitic worms
12	2	2	Cestodes_Diphyllobothrium latum; Taenia worms; T. saginata	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
13	2	2	Taenia solium_Taeniasis and Neurocysticercosis	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
14	2	2	Hymenolepis nana; Echinococcus granulosus (hydatid cyst); Filaria_Onchocerca volvulus (River blindness)	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
15	2	2	Trematodes_Schistosomes ; Nematodes: Ascaris Lumbricoides	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
16	2	2	Enterobius vermicularis; Trichinella spiralis; Ankylostoma duodenale	Introduction, history, Epidemiology, morphology, life cycle, pathogenesis, clinics, lab diagnosis.
<p>1 Lecture = 50 minutes Hour per week = 4 Total credit = 4</p>				

**Goal:**

After completion of this course the students will be able to:

- ✓ Describe basic information about parasitology and parasites.
- ✓ Identify different kinds of parasites.

**Course objectives:**

- ✓ To know the Introduction to parasitology; host and parasite relationships; Nomenclature.
- ✓ To know the protozoan.

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- ✓ To know the helminthes.

**Skills:**

- ✓ To build up Communications skill.
- ✓ The skills of laboratory test for diagnosis of protozoan and helminthes.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Microbiology, 2nd Edition (Lippincott's Illustrated Reviews): Richard A. Harvy, Pamela C. Champe, Bruce D. Fisher
2. Clinical microbiology made ridiculously simple, 3rd edition: Mark Gladwin, M.D; Bill Trattler, M.D.
3. Practical handbook of Mircrobiology, 2nd edition: Edited by Emanuel Goldman and Lorrence H. Green

Third year: Second semester

Islamic studies 6

<b>Islamic studies 6</b>				
<b>Discipline</b>		<b>Releigious</b>		
<b>Department</b>		<b>Islamic Studies</b>		
<b>Course Title</b>		<b>Uloomul quran</b>		
<b>Course code</b>		<b>ML601</b>		
<b>Prerequisite</b>		<b>Islamic studies 5</b>		
<b>Academic year</b>		<b>III</b>		
<b>Semester</b>		<b>6</b>		
<b>Number of Credits</b>		<b>1</b>	<b>Theory</b>	<b>1</b>
			<b>Practical</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
1	1			<b>Uloom-ul-Quran: Basic Concept of Quran</b>
2	1			<b>Uloom-ul-Quran: History of Quran</b>
3	1			<b>Difference between Quran and Qudsi Hadith</b>
4	1			<b>Revelation: General Information</b>
5	1			<b>Quran is Allah's Word</b>
6	1			<b>Quran is Allah's Word</b>
7	1			<b>Quran and Science</b>
8	1			<b>Quran and Science</b>
9	1			<b>Quran and Scence</b>
10	1			<b>Gradually Revelation of Quran</b>
11	1			<b>Deciplines or Manners for Recitation of the Quran</b>
12	1			<b>Women's Right in Islam</b>
13	1			<b>Allah's right and Human Rights in Islam</b>
14	1			<b>Concept of God in other religion</b>
15	1			<b>Islam and Comparative Relegion</b>

16	1		Paradise rewards and Hell's punishments
1 Lecture = 50 minutes Hour per week = 1 Total credit = 1			

**Goal:**

Know the history of quran, quran and science, women,s right in islam and paradise rewards

**Course objectives:**

- ✓ To know the Basic Concept of Quran.
- ✓ To know the Quran and Science.
- ✓ To know the Allah's right and Human Rights in Islam

**Skills:**

- ✓ To build up Communications skill.
- ✓ How to apply the Allah's right and Human Rights in Islam.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%.

**✓ References**

1. Quran
2. Hadis

**Clinical biochemistry-3**

<b>Clinical Biochemistry-3</b>				
<b>Discipline</b>		<b>Medical Laboratory Technology</b>		
<b>Department</b>		<b>Medical Technology</b>		
<b>Course Title</b>		<b>Clinical Biochemistry -3</b>		
<b>Course code</b>		<b>ML616</b>		
<b>Prerequisites</b>		<b>Clinical Biochemistry 2</b>		
<b>Class</b>		<b>3</b>		
<b>Semester</b>		<b>6</b>		
<b>Number of Credits</b>		<b>4</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>2</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>2</b>	<b>The Biochemistry of Endocrine Glands: General Mechanism of Action of Hormones:</b>	Introduction, Classification, Factors Regulating Hormone Action, General Properties of Hormones.
<b>2</b>	<b>2</b>	<b>2</b>	<b>Pituitary Hormones Pituitary Tropic Hormones</b>	Introduction, Hormones of the Anterior Pituitary [Growth H. (Chemistry, Functions, Regulation of Growth H. Secretion, Clinical Importance) (Regulation of Secretion and Functions) such as Prolactin, Gonadotropins, FSH and LH, Thyrotropic Hormones (TSH) and Adrenocorticotrophic Hormone (ACTH).
<b>3</b>	<b>2</b>	<b>2</b>	<b>Hormone of Middle Lobe of Pituitary (Melanocyte Stimulating Hormones): Hormones of Posterior Pituitary Lobe (Vasopressin, Oxytocin): Pituitary Tests</b>	Functions, Clinical Importance, Regulation of Secretion. Functions and Clinical Importance, Abnormalities of Pituitary Function. ACTH, ADH, FSH/LH, Growth Hormone, Prolactin, Thyroid-Stimulating Hormone

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4	2	2	<p><b>Thyroid Gland Hormones (Thyroxin, Tri-iodoThyronine)</b></p> <p><b>Parathyroid Glands and their Hormones: Parathormone, Calcitonin</b></p> <p><b>TFT (Thyroid function test)</b></p>	<p>Introduction, Metabolism, Mechanism of Action, Actions, Regulation, Abnormalities.</p> <p>Introduction Chemistry, Biosynthesis, Metabolism, Mechanism of Action, Actions, Regulation, Abnormalities of Parathyroid Function).</p> <p>(Free T3, Total T3, Free T4, Total T4, Thyroglobulin, TBG, TSH, TRH)</p>
5	2	2	<p><b>Pancreas and its Hormones: Insulin Glucagon</b></p>	<p>Introduction (Chemistry, Biosynthesis, Secretion, Regulation, Transport and Metabolism, Mechanism of Action, Metabolic Role and Functions of Insulin). (Descriptions like Insulin), Somatostatin (Chemistry and Functions).</p>
6	2	2	<p><b>Adrenal Glands and their Hormones: Adrenal Cortex and Steroid Hormone</b></p>	<p>Introduction [Classification (Glucocorticoids, Mineralo-Corticoids, Cortical Sex Hormones)]</p>
7	2	2	<p><b>Glucorticoids Mineralo-Corticoids and Cortical Sex Hormones (Androgens and Estrogens)</b></p>	<p>(Biosynthesis, Secretion and Transport, Mechanism of Action, Actions, Regulation, Abnormalities). Descriptions like Glucocorticoids</p>
8	2	2	<p><b>Adrenal Medullary Hormones (Epinephrine and Nor epinephrine): Adrenal Function Test</b></p>	<p>Introduction, Metabolism, Mechanism of Action, Metabolic Effects, Abnormalities or Clinical Aspects. ACTH, Aldosterone, Cortisol, 17-ketosteroids, Preganetriol, Renin Activity, Catecholamines,</p>
9	2	2	<p><b>Gonadal Hormones [Androgens, Female Sex Hormones (Oestrogens), Gestogens (Progestational H.) Progestational Hormones</b></p>	<p>Introduction, Androgens (Male H.) , Female Sex H. (Description Like above Hormones). (Descriptions Like above Hormones).</p>

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10	2	2	<b>Relaxin Placental Hormones Gastrointestinal Hormones:</b>	(Chemistry and Action) (Descriptions Like above Hormones)  Introduction, Secretin Family and Gastrin Family
11	2	2	<b>Examination of CSF</b>	Formation and physiology, specimen collection and Handling, Appearance, Cell count, Differential count on CSF specimen, chemistry test, microbiology test and serology test
12	2	2	<b>Urine Analysis or Urinalysis</b>	Physical and chemical and Microscopic examination
13	2	2	<b>Semen Analysis</b>	Physical, chemical and microscopic examination
14	2	2	<b>Other body fluid analysis</b>	Amniotic fluid and synovial fluid and serous fluid examination
15	2	2	<b>Fecal Analysis</b>	Physiology, Diarrhea and Steatorrhea, Specimen collection, Macroscopic examination (color, appearance), microscopic examination (fecal leukocyte and ...) and chemical test (Occult blood, Fecal enzyme, carbohydrates, ...)
16	2	2	<b>Stone Analysis</b>	Kidney stone, bile stone and slavia stone analysis
<p>1 Lecture = 50 minutes Hour per week = 4 Total credit = 4</p>				

**GOAL:**

Describing the clinical endocrinology test and body fluid analysis.

**COURSE OBJECTIVE:**

Getting to know biochemical and structural of endocrines hormones and their glands, gland's anatomy and physiology, body fluids, production path, its disorders and their analysis.

**SKILLS**

After completion of this course students will be able to:

- ✓ Describe any hormones and their origins;
- ✓ Perform assay procedure and functional assessment of hormones;
- ✓ Describe any fluids and their origins;

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- ✓ Perform analysis of various fluids
- ✓ Perform analysis fecal and kidney stone analysis;
- ✓ Diagnose disorders of fluids and hormones and its etiology.

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Medial biochemistry, second edition, 2006
2. Lehninger A.L. biochemistry, The molecular basis of cell structure and function, fifth edition, 2008
3. Lubert Stryer Biochemistry ,Fifth edition, 2002
4. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics, the last edition
5. Urinalysis and body fluids by Susan King and others, sixth edition, 2014

Hematology-3

<b>Hematology-3</b>					
<b>Discipline</b>		<b>Medical Laboratory Technology</b>			
<b>Department</b>		<b>Medical Technology</b>			
<b>Subject</b>		<b>Hematology-3</b>			
<b>Course code</b>		<b>ML618</b>			
<b>Prerequisites</b>		<b>Diagnostic Hematology</b>			
<b>Class</b>		<b>3</b>			
<b>Semester</b>		<b>6</b>			
<b>Number of Credits</b>		<b>3</b>		<b>Lecture</b>	<b>2</b>
				<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>	
	<b>Lecture</b>	<b>Practical</b>			
<b>1</b>	<b>2</b>	<b>1</b>	<b>Chronic myelogenous leukemia</b> <b>Hairy cell leukemia</b>	1- . Definition 2- Epidemiology 3- Pathobiology 4- Clinical features 5- Diagnosis a- Bone marrow b- Cytogenetics a- Chronic myelogenous leukemia b- Accelerated phase c- Blastic phase	
			<b>Chronic lymphogenous leukemia</b>	1- . definition and epidemiology 2- Path physiology 3- Clinical features 4- Diagnosis 5- Differential diagnosis	

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				<ul style="list-style-type: none"> <li>6- Differential diagnosis</li> <li>7- Staging and prognostic factors</li> </ul>
2	2	1	<b>Myelodysplastic syndromes</b>	<ul style="list-style-type: none"> <li>1- Definition</li> <li>2- Pathogenesis</li> <li>3- Classification</li> <li>4- Clinical features</li> <li>5- laboratory features peripheral blood examination                             <ul style="list-style-type: none"> <li>a- Red blood cells</li> <li>b- White blood cells</li> <li>c- Platelets</li> </ul> </li> <li>- Bone marrow examination                             <ul style="list-style-type: none"> <li>a- Bone marrow aspiration</li> <li>b- Bone marrow biopsy</li> <li>c- Cytogenetic analysis</li> </ul> </li> </ul>
			<b>Bone marrow failure aplastic anemia</b>	<ul style="list-style-type: none"> <li>1- Definition</li> <li>2- Epidemiology</li> <li>3- Etiology</li> <li>4- Path physiology</li> <li>5- Clinical manifestations</li> <li>6- Diagnosis</li> </ul>
3	2	1	<b>Systemic vacuities</b>	<ul style="list-style-type: none"> <li>1- Definition</li> <li>2- Classification</li> <li>3- Epidemiology</li> <li>4- Path physiology</li> <li>5- Clinical manifestation</li> <li>6- Diagnosis</li> </ul>
			<b>Polycythemia</b>	<ul style="list-style-type: none"> <li>1- Definition</li> <li>2- Classification</li> <li>3- Epidemiology</li> <li>4- Path physiology</li> <li>5- Clinical manifestation</li> <li>6- Diagnosis</li> </ul>
4	2	1	<b>ITP</b>	<ul style="list-style-type: none"> <li>1- Definition</li> <li>2- Path physiology</li> <li>3- Clinical manifestation</li> <li>4- Diagnosis</li> </ul>
5	2	1	<b>Hemophilia A Hemophilia B</b>	<ul style="list-style-type: none"> <li>1- Inheritance</li> <li>2- Clinical features</li> <li>3- Laboratory features</li> </ul>
6	2	1	<b>Von willebrand disease</b>	<ul style="list-style-type: none"> <li>1- . Hereditary VW disease                             <ul style="list-style-type: none"> <li>a- Definition</li> <li>b- Pathobiology</li> <li>c- Clinical manifestations</li> </ul> </li> </ul>

				d- Diagnosis
7	2	1	Laboratory control of anticoagulant thrombolytic, and antiplatelet therapy	<ul style="list-style-type: none"> <li>- Oral anticoagulant treatment</li> <li>- Standardization of oral anticoagulant treatment control</li> <li>- Determination of the international normalized ratio</li> <li>- Capillary reagent</li> <li>- Therapeutic range and choice of thromboplastin</li> <li>- Management of overanticoagulation</li> <li>- Heparin treatment</li> <li>- Laboratory control</li> <li>- Activated partial thromboplastin time for heparin monitoring</li> <li>- Heparin monitoring at the bedside</li> <li>- Protamine neutralization test</li> <li>- Heparin – induced thrombocytopenia</li> <li>- Hirudin</li> <li>- Thrombolytic therapy</li> <li>- Laboratory control</li> <li>- Investigation of a patient who bleeds while taking thrombolytic agents</li> <li>- Antiplatelet therapy</li> </ul>
			Malignant lymphomas	<ol style="list-style-type: none"> <li>1- Definition</li> <li>2- Type</li> <li>3- Hodgekin lymphoma               <ol style="list-style-type: none"> <li>a- Definition</li> <li>b- Epidemiology</li> <li>c- Path physiology</li> <li>d- Clinical manifestations</li> <li>e- Diagnosis</li> <li>f- Differential diagnosis</li> <li>g- Laboratory testing</li> </ol> </li> </ol>
8	2	1	Blood transfusion	<ul style="list-style-type: none"> <li>❖ <b>ABO system</b></li> <li>1- Antigen of the ABO system</li> <li>2- Antibodies of the ABO system</li> <li>❖ <b>The Rh system</b></li> <li>1- Antigens of the Rh system</li> <li>2- Rh antibodies</li> </ul>
9	2	1	collection of donor blood processing and storage	<ol style="list-style-type: none"> <li>1- Types of blood donors</li> <li>2- Criteria for selection of blood donors</li> <li>3- Collection of donor blood           <ol style="list-style-type: none"> <li>a- Equipments and materials</li> <li>b- Technique</li> </ol> </li> </ol>

				<ul style="list-style-type: none"> <li>c- Donor reactions</li> <li>4- Processing of donor</li> <li>5- Storage of donor blood unit</li> </ul>
10	2	1	<p><b>Whole blood , blood components and blood derivatives</b></p>	<ul style="list-style-type: none"> <li>A- Whole blood</li> <li>B- Blood components                             <ul style="list-style-type: none"> <li>- Red cell components                                     <ul style="list-style-type: none"> <li>1- Packed red cells</li> <li>2- Red cell suspension</li> <li>3- Leukocyte – poor red cells</li> <li>4- Washed red cells</li> <li>5- Frozen red cells</li> <li>6- Irradiated red cells</li> </ul> </li> <li>- Platelets                                     <ul style="list-style-type: none"> <li>1- Platelet concentrate</li> <li>2- Plateletpheresis</li> </ul> </li> <li>- Granulocyte concentrate</li> <li>- Plasma components                                     <ul style="list-style-type: none"> <li>1- Fresh frozen plasma</li> <li>2- Cryoprecipitate</li> </ul> </li> </ul> </li> <li>C – Blood derivatives                             <ul style="list-style-type: none"> <li>1- Human albumin solutions</li> <li>2- F 8 concentrate</li> <li>3- Prothrombin complex concentrate</li> <li>4- Immunoglobulins</li> </ul> </li> </ul>
			<p><b>Transfusion of blood to the recipients</b></p>	<ul style="list-style-type: none"> <li>1- Selection of donor blood for whole blood or packed red cell transfusion</li> <li>2- Selection of donor plasma</li> <li>3- Antibody screening and identification</li> <li>4- Compatibility test</li> <li>5- Issue of donor blood unit</li> <li>6- Transfusion of blood unit</li> </ul>
11	2	1	<p><b>Adverse effects of transfusion</b></p>	<ul style="list-style-type: none"> <li>A- Immediate complications                             <ul style="list-style-type: none"> <li>1- Febrile – non – hemolytic transfusion reaction</li> <li>2- Hemolytic transfusion reaction</li> <li>3- Allergic reaction</li> <li>4- Anaphylactic reaction</li> <li>5- Transfusion associated lung injury</li> <li>6- Circulatory over load</li> <li>7- Bacterial contamination of donor unit</li> </ul> </li> <li>B- Delayed complication                             <ul style="list-style-type: none"> <li>1- Delayed hemolytic Transfusion reaction</li> <li>2- Post transfusion purpura</li> <li>3- Transmission of infectious</li> </ul> </li> </ul>

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				<p>organisms</p> <p>4- Iron over load</p> <p>Complication associated with massive blood transfusion</p>
<b>12</b>	<b>2</b>	<b>1</b>	<p><b>Chronic myelogenous leukemia</b></p> <p><b>Hairy cell leukemia</b></p>	<p>6- . Definition</p> <p>7- Epidemiology</p> <p>8- Pathobiology</p> <p>9- Clinical features</p> <p>10- Diagnosis</p> <p>c- Bone marrow</p> <p>d- Cytogenetics</p> <p>d- Chronic myelogenous leukemia</p> <p>e- Accelerated phase</p> <p>f- Blastic phase</p> <p>6- . definition and epidemiology</p> <p>7- Path physiology</p> <p>8- Clinical features</p> <p>9- Diagnosis</p> <p><b>10- Differential diagnosis</b></p>
<b>13</b>	<b>2</b>	<b>1</b>	<p><b>Chronic lymphogenous leukemia</b></p>	<p>8- . Definition</p> <p>9- Epidemiology</p> <p>10- Path physiology</p> <p>11- Clinical features</p> <p>12- Diagnosis</p> <p>13- Differential diagnosis</p> <p>14- Staging and prognostic factors</p>
<b>14</b>	<b>2</b>	<b>1</b>	<p><b>Myelodysplastic syndromes</b></p>	<p>6- Definition</p> <p>7- Pathogenesis</p> <p>8- Classification</p> <p>9- Clinical features</p> <p>10- laboratory features peripheral blood examination</p> <p>d- Red blood cells</p> <p>e- White blood cells</p> <p>f- Platelets</p> <p>- Bone marrow examination</p> <p>d- Bone marrow aspiration</p> <p>e- Bone marrow biopsy</p> <p>f- Cytogenic analysis</p>
<b>15</b>	<b>2</b>	<b>1</b>	<p><b>Bone marrow failure aplastic anemia</b></p>	<p>7- Definition</p> <p>8- Epidemiology</p> <p>9- Etiology</p> <p>10- Path physiology</p> <p>11- Clinical manifestations</p>

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				12- Diagnosis
<b>16</b>	<b>2</b>	<b>1</b>	<b>Systemic vacuities</b>	7- Definition 8- Classification 9- Epidemiology 10- Path physiology 11- Clinical manifestation 12- Diagnosis
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

### GOAL

After completion of this course students able to recognition of blood and coagulations diseases and understanding the basics of blood and disorders and diagnostic approach of them by routine and molecular pathology procedure.

### COURSE OBJECTIVE:

The students should be able to know:

- ✓ Disorders of bone marrow ;
- ✓ Diagnostic procedure of disorders;
- ✓ Blood transfusions and its clinical applications;
- ✓ Compatible tests for blood transfusions.

### SKILLS

After completion of this course students will be able to:

- ✓ Understand the different diseases related to bone marrow disorders as aplastic anemia, different types of leukemia.
- ✓ Know concepts related to hemophilia and lab control of anticoagulants.
- ✓ Know and perform experiments to diagnose hemostasis disorders
- ✓ Describe principals of blood transfusions and its components
- ✓ Perform blood transfusions
- ✓ Perform compatibility tests required before transfusions.

### TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### EVALUATION:

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%

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✓ Class activity, tests during the semester, attitude in contributing to group work 20%

## **Reference**

1. Dacie and Lewis practical hematology, eleventh edition, 2011
2. Hematology clinical principles and applications, fourth edition, 2012
3. Hematology in clinical practice, fifth edition, 2010
4. Color Atlas of Hematology.1998
5. Andeson's Atlas of Hematology, 2 edition
6. Harmening, Clinical Hematology and Fundamentals of Hemostasis,5<sup>th</sup> edition,F.A.Davis

Histotechnology

<b>Histotechnology</b>					
Discipline		Pathology			
Department		Pathology			
Subject		Histotechnology			
Course code		ML608			
Prerequisites		Cytology and Cytotechnology			
Class		3			
Semester		6			
Discipline		Medical Laboratory Technology			
Number of Credits		3		Lecture	2
				Practical	1
Weeks	Hours		Topics	Demonstration	
	Lecture	Practical			
1	2	1	<b>Introduction and Definition of fixation</b>	Introduce the subject objectives definition of fixation, Function and actions of fixatives, Factors affecting fixatives, and reaction of the cell with fixatives	
			<b>Simple aqueous fixatives</b>	Acetic acid, Formaldehyde, Glutaraldehyde, Glyoxal, Mercuric chloride, Osmium tetroxide, Picric acid, Potassium dichromate, Zinc salts, and others	
2	2	1	<b>Compound fixatives</b>	B-5 Fixative, Zenker and Helly solution, and Zinc formalin solution	
			<b>-Nonaqueous Fixatives -Transport solutions - Removal of fixation pigments - Troubleshooting fixation problems</b>	<ul style="list-style-type: none"> <li>- Acetone, Alcohol (Carnoy solution and Clarke fluid)</li> <li>- Michel Transport medium</li> <li>- Lugol iodine solution</li> <li>- Autolysis and Incomplete fixation</li> </ul>	

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3	2	1	Processing	Dehydration, Clearing, Infiltration, and Troubleshooting processing
			Processing	Embedding and Specimen orientation Troubleshooting embedding Special technique in processing
4	2	1	Instrumentation	Microscopes Microtomes
			Instrumentation	Cryostat Strainers and Cover slippers Miscellaneous equipment Instrument quality control
5	2	1	Safety	Biological or infectious hazards Mechanical hazards Chemical hazards Hazard identification General safety practices
			Laboratory mathematics and Solution preparation	Percentage solution, Use of the gravimetric factor in solution preparation, Hydrates, Normal and Molar solution
6	2	1	Laboratory mathematics and Solution preparation	The metric system Buffers General guidelines for solution preparation, use, and storage Stability of solution
			Nuclear and Cytoplasmic Staining	Ultrastructure of the cell Staining mechanisms -Nuclear staining - Cytoplasmic staining
7	2	1	The Dyes	Factors affecting dye binding Differentiation The nuclear dyes Plasma stains
			H&E Staining	Manual staining method Automated staining Frozen section staining
8	2	1	Troubleshooting the H&E Stain	All troubles that occur during staining

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			<ul style="list-style-type: none"> <li>-Nucleic acid stains</li> <li>-Polychromatic stains</li> <li>-Mounting stained section</li> <li>-Troubleshooting mounted stained</li> </ul>	<ul style="list-style-type: none"> <li>-Feulgen reaction and Methyl green-pyronin Y</li> <li>-May-Grunwald Giemsa stain</li> <li>-Resinous media, Aqueous mounting media, and Coverslips</li> <li>-All troubles</li> </ul>
9	2	1	Carbohydrates	Neutral polysaccharides, Acid mucopolysaccharides, Glycoproteins, and Glycolipids
			Carbohydrates	<b>Special staining techniques:</b> PAS reaction, Best carmine, Mayer mucicarmine, Alucian Blue, Alucian Blue with hyaluronidase, and MÜller-Mowry Colloidal Iron
10	2	1	Amyloid	Alkaline Congo Red method, Crystal violet, and Thioflavine T Fluorescent method
			Connective and muscle Tissue	Staining technique for connective tissue fibers, Basement membranes, and cells
11	2	1	Connective and muscle Tissue	Staining techniques for muscle
			Connective and muscle Tissue	Staining techniques for lipid
12	2	1	Nerve	Special staining techniques for Nissl substance and Nerve fibers
			Nerve	Special staining techniques for Glial fibers and Myelin sheath
13	2	1	Pigments, Minerals, and Cytoplasmic granules	Special staining techniques for Iron, Melanin, and Argentaffin granules
			Pigments, Minerals, and Cytoplasmic granules	Special staining techniques for Urates, Bile, Calcium, and Copper

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14	2	1	<b>Immunohistochemistry</b>	Introduction, Tissue handling, and Methods of Visualization
			<b>Immunohistochemical Staining</b>	Methods, Controls, and Antibody evaluation and validation
15	2	1	<b>Immunohistochemical Staining</b>	Commonly used antibodies and their application, Quality control, and Troubleshooting immunoperoxidase techniques
			<b>Immunohistochemical Staining</b>	Staining techniques
16	2	1	<b>Enzyme Histochemistry</b>	Introduction, Properties, Preservation and Classification of enzymes
			<b>Enzyme Histochemistry</b>	Freezing muscle biopsy specimens stains
1 Lecture = 50 minutes Hour per week = 3 Total credit = 3				

### GOAL

Describing the fixation and processing of the specimen, Nuclear and Cytoplasmic Staining and Immunohistochemical Staining.

### COURSE OBJECTIVE:

This course is talking about manual procedure in pathology laboratory.

### SKILLS

After completion of this course students will be able to:

- ✓ To know the principles of preparing slides for examination;
- ✓ To prepare samples for histopathology examination.

### TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

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**EVALUATION:**

- |   |     |
|---|-----|
| ✓ Written final examination   | 60% |
| ✓ Skills lab examination  | 20% |
| ✓ Class activity, tests during the semester, attitude in contributing to group work | 20% |

**Reference**

1. Handbook of histopathological techniques-CFA culling.

**Immunology- Serology**

<b>Immunology –serology</b>					
Discipline		Para clinic			
Department		Microbiology			
Course Title		Immunology –serology			
Course code		ML609			
Prerequisites		Diagnostic Microbiology- Human Physiology			
Class		3			
Semester		6			
Number of Credits		<b>4</b>		Lecture	<b>3</b>
				Practical	<b>1</b>
Weeks	Hours		Topics	Demonstration	
	Lecture	Practical			
<b>1</b>	<b>3</b>	<b>1</b>	<p><b>Introduction of Immunology&amp; History and impact of immunology on human life&amp; Classification of immunity and immune cells</b></p>	<p>Definition, scope of study, reference, useful tips History of infectious diseases and their impact on human life, Role of Variolation in the prevention of small pox... What is immunity?; phagocytic and lymphoid cells and their types.</p>	
<b>2</b>	<b>3</b>	<b>1</b>	<p><b>Natural immunity&amp; Specific immunity</b></p>	<p>Special, Racial and individual immunity; mechanical barriers to infections; Biological and Humoral factors Complement system and it's activation pathways; Cellular components and inflammation Review of lymphoid cells, their development and types; types of specific reactions; Cellular and humoral components and their activation pathway</p>	
<b>3</b>	<b>3</b>	<b>1</b>	<p><b>Passive immunity and vaccination Antigen Antibody</b></p>	<p>Immunoglobuline therapy; General properties of vaccines; vaccine types Defination, active sites, structure, classification according to structure; Bacterial cell antigens; Fate of antigens Defination, structure, Active sites; Immunoglobulins, antibody synthesis theories</p>	

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4	3	1	<b>Immunologic reactions</b>	Defination, importance, Neutralization test; Agglutination test (Direct and indirect), types Oponization and opsonins; Precipitation; Immunoelctrophoresis Lysis; complement fixation; Coomb's test; Eliza; PCR
5	3	1	<b>Allergy and Hypersensitivity</b>	Introduction, types of reactions; Hypersensitivity type I and II Hypersensitivity type III and IV
6	3	1	<b>Histocompatibility, Autoimmunity ELISA,fluorecence,flow</b>	Autoimmunity, Tumor immunity
7	3	1	<b>Serology</b>	Counter electerophoresis
			<b>Laboratory procedures in serology</b>	Overview and Diagnosis of infection
8	3	1	<b>Collection and preparation of specimen</b>	Collection of serum specimen, Heat – inactivation of serum specimen, Reagents and Equipment
			<b>Detection of parameters of Inflammation</b>	CRP,Total complement,C3 and c4,Latex agglutination, and Radial immunodiffusion
9	3	1	<b>Agglutination Tests for serodiagnosis of febrile illnesses</b>	Enteric fever,Widal test for enteric fever,procedure and interpretation,Typhoid test
			<b>Weil-felix Test for Rickettsial fevers</b>	Rickettsial diseases,Overview and its procedure
10	3	1	<b>Standard Agglutination Tests for Brucellosis</b>	Brucellosis,Slide tests and its procedure
			<b>Paul-Bunnel Test</b>	Epstien-barr virus infection,Procedure and its interpretation
11	3	1	<b>Serodiagnosis of syphilis&amp; Qualitative slide test for sera and Quantitative serum slide Test and VDRL Test on CSF and toxoplasma</b>	Procedures and its interpretation

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			antibodies	
12			Serodiagnosis of syphilis & Qualitative slide test for sera and Quantitative serum slide Test and VDRL Test on CSF and toxoplasma antibodies	Procedures and its interpretation
13	3	1	Diagnosis of Autoimmune disorders (Rheumatoid factor)	Rheumatoid Arthritis, latex Agglutination, Procedure and its interpretation
			Antinuclear Antibody	Immunofluorescence
14	3	1	Serodiagnosis of streptococcal infection	Streptococcal infection, ASO Test procedure and its interpretation, Quantative and Quality methods of ASO
15	3	1	Anti Ds DNA antibody and anticardiolipin antibody	Enzyme immunoassay and Enzyme assay
16	3	1	Cold Agglutination Test for M.pneumonia Infection	Mycoplasma pneumonia infections, Overview and its procedure
<p>1 Lecture = 50 minutes Hour per week = 4 Total credit = 4</p>				

## GOAL

An introduction to the theory and application of basic immunology, including the immune response, principles of antigen-antibody reactions, and the principles of serological procedures as well as quality control, quality assurance, and safety.

## COURSE OBJECTIVE:

This course emphasizes routine immunology/serology procedures and interpretations of test results in relationship to disease states. This course is a health-related, work-based learning experience that enables the student to apply specialized occupational theory, skills, and concepts. Direct supervision is provided by the clinical laboratory professional. The course provides clinical training in a working clinical laboratory with an emphasis on basic understanding and knowledge of immunology and related instrumentation and techniques.

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The student will perform routine and special procedures. The student will learn to correlate disease conditions with laboratory results. Also, typical workflow patterns, preventative maintenance, Quality Control, and general laboratory policies will be addressed.

## **SKILLS**

After completion of this course students will be able to:

- ✓ Describe the concepts of nonspecific and specific immunity.
- ✓ Describe the immunologic responses involved in preventing and combating infections.
- ✓ Identify the structure, function, and characteristics of immunoglobulins
- ✓ State the principle of the routine serologic procedures performed in the clinical laboratory.
- ✓ Read and correctly follow instructions provided in reagent package inserts, as needed, to obtain valid results.
- ✓ Evaluate specimen acceptability by Collect, process, and analyze immunology/serology specimens;
- ✓ Evaluate laboratory test outcomes and determine the validity of the test results obtained.
- ✓ Perform and evaluate quality control results as required by the procedure and use the results to evaluate the patient results obtained.
- ✓ Evaluate and correlate test results with associated diseases or conditions.
- ✓ Recognize the limitations of each laboratory procedure performed and describe how these may affect the results of the testing performed.
- ✓ Apply principles of safety, quality assurance and quality control in Immunology/Serology
- ✓ Maintain a safe laboratory environment.
- ✓ Demonstrate improvement in the affective traits of organizational skills, work habits, attitude, interpersonal skills, and problem-solving ability.
- ✓ Recognize factors that affect methods and test results and take appropriate actions within established guidelines;
- ✓ Perform and monitor routine departmental quality control;
- ✓ Perform preventive and corrective maintenance of equipment and instruments;
- ✓ Apply principles of laboratory safety, including Universal Precautions;
- ✓ Demonstrate professional conduct and interpersonal communication skills with patients, laboratory personnel, other health care professionals, and with the public.;
- ✓ Apply basic scientific principles in learning new techniques and procedures;
- ✓ Relate laboratory test results to common disease processes;
- ✓ Establish and maintain continuing education as a function of growth and maintenance of personal and professional competence.

## **TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

## **EVALUATION:**

- ✓ Written final examination 60%

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- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

## **Reference**

1. Clinical Immunology & Serology, a Laboratory Perspective, by Christine Dorresteyn Stevens, 4rd edition. F.A. Davis, Copyright 2009. ISBN 978-0-8036-1814-5
2. Medical microbiology, 25<sup>th</sup> edition : Jawetz, Melnick & Adelberg's
3. Kuby immunology, 7<sup>th</sup> ed. ISBN-13:978-14292-1919-8

Advanced Microbiology 1

<b>Advanced Microbiology(VM)1</b>				
Discipline		Para clinic		
Department		Microbiology		
Course Title		Advanced Microbiology(VM)1		
Course code		ML614		
Course pre requisite		General Microbiology		
Class		3		
Semester		6		
Number of Credits		3	Theory	2
			Practical	1
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	1	<b>Viruses:</b> General concepts	Morphology, Structure, classification, Pathogenesis, antiviral medicines
2	2	1	<b>Viruses:</b> General concepts	Attachment, penetration, Uncoating, Gene expression, Genome replication
3	2	1	<b>Viruses:</b> General concepts	Assembly, Release, Lysogeny, Culture and diagnostic methods
4	2	1	<b>DNA Coated</b> viruses	Herpes, Herpes simplex, Varicella zoster viruses
5	2	1	<b>DNA Coated</b> viruses	Cytomegallo. V, Epstein Barr Virus (EBV)
6	2	1	<b>DNA uncoated</b> viruses	Parvoviruses, Adeno viruses
7	2	1	<b>RNA Coated</b> viruses	Influenza virus, Orthomyx virus
8	2	1	<b>RNA Coated</b> viruses	Measles V, Paramix virus

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<b>9</b>	<b>2</b>	<b>1</b>	RNA <b>Coated</b> viruses	Mumps virus, Respiratory syncytial virus
<b>10</b>	<b>2</b>	<b>1</b>	RNA <b>Coated</b> viruses	Rabies virus, rubella virus, Tuga virus
<b>11</b>	<b>2</b>	<b>1</b>	RNA <b>uncoated</b> viruses	Entero viruses, Polio virus
<b>12</b>	<b>2</b>	<b>1</b>	RNA <b>uncoated</b> viruses	Coxackie virus, Echovirus
<b>13</b>	<b>2</b>	<b>1</b>	RNA <b>uncoated</b> viruses	Rio virus, Rota virus, Rhino virus
<b>14</b>	<b>2</b>	<b>1</b>	<b>Tumoral</b> viruses	
<b>15</b>	<b>2</b>	<b>1</b>	<b>Hepatitis</b> viruses	Hepatitis A, B, C, D viruses
<b>16</b>	<b>2</b>	<b>1</b>	<b>HIV AIDS</b>	

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

### **Goal:**

To know the Viruses: General concepts and the DNA and RNA viruses.

### **Course objectives:**

- ✓ To know the Viruses: General concepts.
- ✓ To know the DNA and RNA viruses.

### **Skills:**

- ✓ How to diagnose the viruses.
- ✓ Culture of the viruses.
- ✓ Modulation of some virus.

### **Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

### **Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference:**

1. Medical microbiology, 25<sup>th</sup> edition : Jawetz, Melnick & Adelberg's
2. Microbiology, 2<sup>nd</sup> Edition (Lippincott's Illustrated Reviews): Richard A. Harvy, Pamela C. Champe, Bruce D. Fisher
3. Clinical microbiology made ridiculously simple, 3<sup>rd</sup> edition: Mark Gladwin, M.D; Bill Trattler, M.D.
4. Practical handbook of Mircrobiology, 2<sup>nd</sup> edition: Edited by Emanuel Goldman and Lorrence H. Green

Fourth Year: First Semester

Islamic studies 7

<b>Islamic studies 7</b>				
Discipline		Medical lab Technology		
Department		Islamic Studies		
Title		Basic Concepts of Islamic Knowledge		
Pre-requisites		Islamic studies 6		
Code		ML701		
Class		4		
Semester		7		
Number of Credits		1	Theory	1
			Practical	0
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	1			Basic concept of Islamic Knowledge: General Information, Information about the Islamic Culture
2	1			Basic concept of Islamic Knowledge: Importance of Knowledge in Islam, Quran Verses and Hadith regarding Education.
3	1			Basic concept of Islamic Knowledge: Characteristics of Islamic Law, Quran Verses and Hadith regarding Inventions and changes in human life.
4	1			Memorization and translation of Surah 95 – 114
5	1			Daily Duaa (prayers) according to Hadith and Sunna
6	1			Daily Duaa (prayers) according to Hadith and Sunna
7	1			Daily Duaa (prayers) according to Hadith and Sunna
8	1			Basic concept of Islamic Knowledge:

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				Characteristics of Islamic Law, Aim and Objective of Islamic Law
9	1			Basic concept of Islamic Knowledge: Aim and Objective of Islamic Law
10	1			Basic concept of Islamic Knowledge: Social main deviations
11	1			Definition, importance and ruling of Hijab in Islam : General information
12	1			Definition, importance and ruling of Hijab in Islam: Value and importance.
13	1			Definition, importance and ruling of Hijab in Islam :Concept of Virtue
14	1			Definition, importance and ruling of Hijab in Islam: Quantic Verses and Hadith regarding Hijab.
15	1			Definition, importance and ruling of the Hijab in Islam: Islamic Rules regarding Makeup and women outgoing.
16	1			Definition, importance and ruling of the Hijab in Islam: Conditions for Hijab.

1 Lecture = 50 minutes  
Hour per week = 1  
Total credit = 1

### **Goal:**

The Islamic studies provides a basic and advanced information about Islam and his relationship with medicine in individual fields.

### **Course objectives:**

At the end of course the students well be able to:

- ✓ Explain basic information about Islamic studies
- ✓ To understanding of the students regarding Islamic civilization
- ✓ To perform prayers and other worships
- ✓ To enhance the skill of the students for understanding of issues related to faith and religious life.

### **Skills:**

- ✓ To build up Communications skill.
- ✓ How to apply the Allah's right and Human Rights in Islam.

### **Teaching and learning strategies:**

- ✓ Lecture

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- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%.

**✓ References**

3. Quran
4. Hadis

**Immunoematology**

<b>Immunoematology</b>				
Discipline:		Para clinic		
Department		Physiology		
Course Title		Immunoematology		
Course code		ML718		
Prerequisites		Immunology- Serology		
Class		4		
Semester		7		
Number of Credits		<b>3</b>	Lecture	<b>2</b>
			Practical	<b>1</b>
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
<b>1</b>	<b>2</b>	<b>1</b>	Brief history of blood transfusion	Definition, methods, types, indications,
			Red blood cells, platelets and leukocyte antigens and antibody	Membrane blood group antigen and antibody, ABO, Rh and other blood groups, leukocyte and granulocyte antigens and antibodies.
<b>2</b>	<b>2</b>	<b>1</b>	Introduction of Blood Banking	<ol style="list-style-type: none"> <li>1. Definition of Blood Banking, Organization of Blood Bank, Location of Blood Bank, Map of Blood Bank (Reception, Donation room, Donor's rest room, Lab room, Blood storage room, Freezer room).</li> <li>2. Immunology Lab, Stock for Blood bags and other tools. Documentation of Blood Bank</li> </ol>
			Donor Selection	<ol style="list-style-type: none"> <li>1. Donor selection and Blood collection for Blood Bank</li> <li>2. Blood collection for Blood Bank, preparation of Red cell concentrates</li> </ol>

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3	2	1	Serology of Blood Groups	<ol style="list-style-type: none"> <li>1. Antigens, Antibodies, production of Antibody as an Immunological Action</li> <li>2. Naturally occurring Antibodies and Immune Antibodies, Red Cell Antigen-Antibody Reaction</li> </ol>
			Factors that effects on RBC Antigen-Antibody Reactions	<ol style="list-style-type: none"> <li>1. RBC's Electrical charges, Temperature, pH, Freshness of Serum and RBC, Antigen-Antibody ration, Ionic Strength</li> <li>2. Agglutination of Antibody Coated Red Cells (Use of Albumin, use of Antihuman Globulin), Steps: <ol style="list-style-type: none"> <li>a. Sensitization of RBCs</li> <li>b. RBCs Washing</li> <li>c. Adding of AHG</li> </ol> </li> <li>3. Use of Proteolytic Enzyme</li> <li>4. Complement</li> </ol>
4	2	1	Blood Groups ABO System	<ol style="list-style-type: none"> <li>1. ABO System, /genetics of ABO System</li> <li>2. Blood Grouping ABO System, use of "O" Group RBCs for Blood Serum grouping, Development of A&amp;B Antigens of RBC</li> </ol>
5	2	1	Sub groups	<ol style="list-style-type: none"> <li>1. The Subgroups of Antigen –A, Anti AB and Anti A, Secretary Status/ Conditions</li> <li>2. IgG&amp;IgM, Anti–A and Anti-B.</li> </ol>
6	2	1	Rh System	<ol style="list-style-type: none"> <li>1. Rh System, Clinical importance of Rh, Essential of Genetics for Rh System</li> </ol>
7	2	1	Development of RhD	<ol style="list-style-type: none"> <li>1. Development of RhD, Importance of RhD grouping, RhD, Test for D<sup>u</sup>, Partial D</li> <li>2. Applied Techniques in Blood Bank, reading of a reaction, Micro plate technique,</li> </ol>
			Indicators for Blood Grouping	<ol style="list-style-type: none"> <li>1. RBCs for blood grouping, storage of RBCs</li> <li>2. Serum, testing of Antiserums and RBCs before use</li> </ol>
8	2	1	Compatibility Tests	<ol style="list-style-type: none"> <li>1. Blood Grouping of ABO and RhD, Blood grouping of donors, Blood grouping of Recipients, sources of Errors for Bloog grouping</li> <li>2. Major and Minor Cross Match, Phases</li> </ol>

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				for cross match
9	2	1	<b>Compatibility Tests</b>	1. Direct Coomb's Test, 2. Indirect Coomb's Test
10	2	1	<b>Hemolytic disease of the newborn</b>	Definition, etiology, clinic, treatment, prevention, complications, prognosis.
			<b>Types of blood bags and their anticoagulants</b>	Kinds, composition of anticoagulants, classification of bags and volumes
11	2	1	<b>Anti D Globulin Titre</b>	1. Anti D Globulin titre, 2. Anticoagulants
12	2	1	<b>Formulas</b>	1. Formula "A" of National Institute of Health (NIH), Formula "B" of NIH 2. Citrate Phosphate Dextrose (CPD)-III, CPD with Adenine- IV, Advantages of CPD with Adenine, Heparin –V
13	2	1	<b>Techniques for preservation of RBC's</b>	1. ATP preservation 2. Course review and participant's evaluation
14	2	1	<b>Blood Components</b>	1. Introduction of Blood Components, Packed Cells and Plasma 2. Packed Cells and Plasma 3. Fresh frozen plasma and related products
15	2	1	<b>Checklists for Blood Banking</b>	1. Checklist for signs of destruction of Blood or Plasma 2. Checklist for Blood / Plasma Distribution.
16	2	1	<b>Complications of blood transfusion</b>	Infectious and noninfectious complications
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## **GOAL**

Immunoematology is structured to meet the MLT Program goals addressing to:

- ✓ developing a working knowledge of the principles and procedures of blood bank testing,
- ✓ producing accurate, skilled clinical laboratory workers with strong ethical and professional values,

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- ✓ promoting respect and understanding of allied health professionals through renewed understanding of the clinical laboratory technician's role as a member of the allied health care team.

**COURSE OBJECTIVE:**

The students should be able to know:

- ✓ Types of blood groups and their biochemical and structure
- ✓ Producer of typing various blood group
- ✓ Blood components and their transfusions and clinical applications;
- ✓ Producer of blood banking tests and antibody screening tests;
- ✓ Compatible tests for blood transfusions.

**SKILLS**

After completion of this course students will be able to:

- ✓ Describe principals of blood transfusions and its components;
- ✓ Perform blood transfusions;
- ✓ Perform quality control in immunohematology laboratory to catch high accuracy and precision;
- ✓ Perform compatibility tests required before transfusions.
- ✓ Exhibit knowledge of safety and quality control used in a blood bank laboratory;
- ✓ Describe the function of the human immune system as it applies to the principles of immunology, serology and blood bank testing;
- ✓ Apply the biological concepts of genetics and immunology to antigen and antibody development in ABO, Rh, and other blood group systems;
- ✓ Demonstrate knowledge and the application of principles of serological testing in pre-transfusion and compatibility testing and in the selection of component therapy as they relate to current blood bank practices;
- ✓ Incorporate knowledge of Hemolytic Disease of the Fetus/Newborn in the evaluation of prenatal, maternal and cord blood testing as it applies to current blood bank practices.
- ✓ Demonstrate competency in the performance and result evaluation of routine blood bank procedures;
- ✓ Research and give a classroom presentation on an assigned blood group system. Include information on genotype and phenotype frequencies and ethnic group diversities commonly associated with that system;
- ✓ Value working collaboratively using professional communication skills and behavioral attitudes while working with fellow students in the laboratory.

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- |                             |     |
|-----------------------------|-----|
| ✓ Written final examination | 60% |
| ✓ Skills lab examination    | 20% |
|                             | 189 |

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✓ Class activity, tests during the semester, attitude in contributing to group work 20%

## **Reference**

1. Dacie and Lewis practical hematology, eleventh edition, 2011
2. Hematology clinical principles and applications, fourth edition, 2012
3. Hematology in clinical practice, fifth edition, 2010
4. Hematology: A pathophysiology approach, 2012
5. Harmening, Clinical Hematology and Fundamentals of Hemostasis, 5<sup>th</sup> edition, F.A. Davis

**Advanced Microbiology (VM)2**

Discipline		Para clinic		
Department		Microbiology		
Course Title		Advanced Microbiology(VM)2		
Course code		ML714		
Prerequisite		General Microbiology		
Class		4		
Semester		7		
Number of Credits		3	Theory	2
			Practical	1
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	2	1	Mycology	Introduciton,classification and general properties of fungus
2	2	1	Mycology and superficial mycosis	Opportunistic fungi , filamentous bacteria and tinea versicolor
3	2	1	Cutaneous mycosis	Morphology,antigenic structure,clinical picture,laboratory diagnosis ,treatment and prevention
4	2	1	Sub Cutaneous mycosis	Morphology,antigenic structure,clinical picture,laboratory diagnosis ,treatment and prevention
5	2	1	Deep mycosis	Morphology,antigenic structure,clinical picture,laboratory diagnosis ,treatment and prevention
6	1	1	Oppurtunistic mycosis	Morphology,antigenic structure,clinical picture,laboratory diagnosis ,treatment and prevention
7	2	1	Laboratory Diagnosis of fungal infections	Specimens collection ,Histopathology of fungal infections,Macroscopic examination,Direct microscopic examination,wet mount in water , wet mount in alkaalin solution and india ink preparation

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<b>8</b>	<b>2</b>	<b>1</b>	<b>Laboratory culture of fungi</b>	Media requirements and incubations conditions and preparation of culture media for mycotic agents
<b>9</b>	<b>2</b>	<b>1</b>	<b>Diagnostic Mycology</b>	Laboratory diagnosis of dermatomycosis
<b>10</b>	<b>2</b>	<b>1</b>	<b>Laboratory Diagnosis of subcutaneous Mycosis</b>	Sporothrix schenckii and its diagnosis, Maduromycosis and its diagnosis, chromoblastomycosis and its diagnosis and mycetomas and its diagnosis
<b>11</b>	<b>2</b>	<b>1</b>	<b>Laboratory Diagnosis of systemic Mycosis</b>	Yeasts and its diagnosis, yeast –like organisms and its diagnosis and Dimorphic organisms and their diagnosis
<b>12</b>	<b>2</b>	<b>1</b>	<b>Rhizopus , Absidia and Mucor</b>	Overview, morphology, culture and lab diagnosis
<b>13</b>	<b>2</b>	<b>1</b>	<b>Summary of procedures in Mycology</b>	Types of clinical specimens examined , media required , Microscopic procedures and cultural procedures
<b>14</b>	<b>2</b>	<b>1</b>	<b>Laboratory study of superficial , cutaneous mycoses and systemic Mycoses</b>	Preliminary examination such as woods lamp examination , Microscopic examination, Clinical materials examined and cultural procedures
<b>15</b>	<b>2</b>	<b>1</b>	<b>Anti fungal chemotherapy</b>	Polyenes, Azoles, Allylamines, flucytosin, Griseofulvin and potassium iodide
<b>16</b>	<b>2</b>	<b>1</b>	<b>Mycotoxicosis</b>	Amatoxins , phallotoxins and summary of humans mycetismus

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

**Goal:**

To know the Mycology and different types of mycosis and Diagnostic Mycology.

**Course objectives:**

- ✓ To know the Mycology and different types of mycosis
- ✓ To know Diagnostic Mycology.
- ✓ To know Anti fungal chemotherapy.
- ✓ To know mycotoxins.

**Skills:**

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- ✓ To build up Communications skill.
- ✓ How to do fungal diagnostic tests.
- ✓ How to do the fungal culture.
- ✓ How to do the fungal chemotherapy.

**Teaching and learning strategies:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ PBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 60%
- ✓ Skills lab examination ..... 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

Quality Laboratory Management

Quality Laboratory Management					
Discipline		Medical Laboratory Technology			
Department		Medical Technology			
Course Title		Quality laboratory management & Automation			
Course code		ML710			
Prerequisites		Immunology- Serology 2, Hematology-3, Clinical biochemistry-3, Diagnostic Microbiology			
Class		4			
Semester		7			
Number of Credits		3		Lecture	2
				Practical	1
Weeks	Hours		Topics	Demonstration	
	Lecture	Practical			
1	2	1	History of medical laboratory technology	Defination of laborator Defination of medical laborator Significance of medical laboratory in medical field Classification of medical laboratory	
			General works in clinical laboratories	Establishment of clinical laboratory and primary principles of laboratory works	
2	2	1	Necessary recommendation for higher medical technologist	Protection and control of laboratory staff and from different laboratory materials and burnable components	
			Auto analyzer in medical laboratory	Spectrophotometer and colorimeter	
3	2	1	Auto analyzer in medical laboratory	Microlabe (biochemistry analyzer) Flame photometer	

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			<b>Auto analyzer in medical laboratory</b>	Electrolyte analyzer Blood gas analyzer Urine analyzer
<b>4</b>	<b>2</b>	<b>1</b>	<b>Auto analyzer in medical laboratory</b>	Hormon analyzer ELISA analyzer Hematoloty analyzer Hood, Fume Hood (F.H) and biological safety cabinet (B.S.C)
<b>5</b>	<b>2</b>	<b>1</b>	<b>Automation and Auto Analyzer in clinical biochemistry</b>	Types of autoanalyzer Significant points in the usage of auto analyzer Maintenance and quality control of auto analyzer
<b>6</b>	<b>2</b>	<b>1</b>	<b>Statistic and significance of measuring</b>	Measure of central tendency Measure of disperrision Errors of the practice Accuracy,Precession,Sensitivity,specifity
<b>7</b>	<b>2</b>	<b>1</b>	<b>Introduction of quality controle</b>	Factors affecting upon laboratory results
			<b>Quality controle of distilled water and distilled water analyzer</b>	1) Distillation 2) Ion exchange 3) Reverse osmosis
<b>8</b>	<b>2</b>	<b>1</b>	<b>Quality control of laboratory environment</b>	Quality control of laboratory safeness and reportings of events and laboratory enviroment
<b>9</b>	<b>2</b>	<b>1</b>	<b>Biosafety and biosecurity in medical laboratory</b>	Types and control of microbes and primary aids and evaluation of intrinsic and extrinsic random error in medical laboratory
<b>10</b>	<b>2</b>	<b>1</b>	<b>Internal quality control</b>	Basic steps, source of error and their correction methods, CAPA- corrective action & preventive action
			<b>Soruces of variaiton and Quality control charts</b>	Levy-Jennings and cusum charts
<b>11</b>	<b>2</b>	<b>1</b>	<b>External quality control</b>	Intrinsic and extrinsic, random and systematic errors
<b>12</b>	<b>2</b>	<b>1</b>	<b>History of medical laboratory technology</b>	Definiation of laborator Defination of medical laborator Significance of medical laboratory in medical

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				field Classification of medical laboratory
<b>13</b>	<b>2</b>	<b>1</b>	<b>General works in clinical laboratories</b>	Establishment of clinical laboratory and primary principles of laboratory works
<b>14</b>	<b>2</b>	<b>1</b>	<b>Necessary recommendation for higher medical technologist</b>	Protection and control of laboratory staff and from different laboratory materials and burnable components
<b>15</b>	<b>2</b>	<b>1</b>	<b>Auto analyzer in medical laboratory</b>	Spectrophotometer and colorimeter
<b>16</b>	<b>2</b>	<b>1</b>	<b>Auto analyzer in medical laboratory</b>	Microlabe (biochemistry analyzer) Flame photometer
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## GOAL

This course goals are:

- ✓ Meeting accreditation quality requirements
- ✓ Running with the highest efficiency and productivity
- ✓ Providing the highest quality test results for your patient population

## COURSE OBJECTIVE:

This course emphasizes routine automation and technology in laboratory and finally describe quality control management procedure and its roles and graphs.

## SKILLS

After completion of this course students will be able to:

- ✓ Know and describe and perform various automations in laboratory and describe their method and technology;
- ✓ Perform quality control procedure for each department of laboratory and devices;
- ✓ Describe and perform internal and external QC;
- ✓ Matching the roles of QC with graphs.

## TEACHING AND LEARNING STRATEGIES:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

## EVALUATION:

**First Revision -2018 Kabul University Medical Science  
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- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

### **Reference**

1. Tietz Textbook of clinical chemistry by Burits C.A, Ashwood E.R, third edition, 1999;
2. Henry's clinical diagnosis and Management by Laboratory Methods by MCPerson R.A, Pincus M.R, 2006;
3. QC- The levey-jennings control chart by Barry P.L, 2000;
4. Principles of Clinical Laboratory Management, study Guide and Workbook, Jane Hudson

Medical Ethics

<b>Medical Ethics</b>				
Discipline		Forensic Medicine		
Department		Medical Ethics		
Subject		Essential ethics for medical students		
Course code		ML711		
Prerequisite		None		
Class		4		
Semester		7		
Number of Credits		1	Lecture	1
			Practical	0
Weeks	Hours		Topics	Demonstration
	Lecture	Practical		
1	1	0	An scope to medical ethics	History of medical ethics General principles of medical ethics Definition of medical ethics Goals of medical ethics Ethical and law relationships
2	1	0	Medicine	What is Medicine Responsibilities of medical clerks Proficiency need in medicine
3	1	0	Principle and sources of medical ethics	Sources of medical ethics Does medical ethics changes by area and time
4	1	0	Key concepts	Independence Honesty Satisfaction Confidentiality Provision and losses
5	1	0	Islam and medical ethics	History of medicine in Islam Islamic rules in medical ethics Introduction of great Islamic doctors

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<b>6</b>	<b>1</b>	<b>0</b>	<b>Medical deontology part one</b>	Definition of deontology Deontology in internal medicine Deontology in pediatric Deontology in gynecology
<b>7</b>	<b>1</b>	<b>0</b>	<b>Medical Deontology part two</b>	Deontology in forensic medicine Deontology in surgery Deontology in stomatology Deontology in Medical Technology Department Transplantation and Reanimation
1 Lecture = 50 minutes Hour per week = 1 Total credit = 1				

### GOAL

After this course student will:

- ✓ Upgrade the knowledge of doctors and other medical personals
- ✓ Confidence making between medical personals and patients
- ✓ Introduce value of medicines and doctors and other medical personals
- ✓ Realize of medical ethics between medical personals;
- ✓ Realize the Islam roles in medical and ethic
- ✓ Conflict preventions during medical cares
- ✓ Contine and standardize ethics in society

### Course objectives:

- ✓ To know scope to medical ethics;
- ✓ To know the Islam and medical ethics;
- ✓ To know the Medical deontology.

### Skills:

- ✓ Deontology in internal medicine
- ✓ Deontology in pediatric
- ✓ Deontology in gynecology.
- ✓ Deontology in forensic medicine
- ✓ Deontology in surgery
- ✓ Deontology in stomatology
- ✓ Deontology in Medical Technology Department

### Teaching and learning strategies:

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

### Evaluation:

**First Revision -2018 Kabul University of Medical Science  
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- Written final examination ..... 80%
- Class activity, tests during the semester, attitude in contributing to group work 20%

**References:**

1. Gillon R. (1985) Philosophical Medical Ethics, Wiley, Chichester, p.2.
2. Leake CD. (ed.) (1927) Percival's Medical Ethics, Williams & Wilkins, Baltimore.
3. British Medical Association (2001) The Medical Profession and Human Rights: Handbook for a Changing Agenda, Zed Books, London, Chapter 9.
4. Kennedy I. (1981) The Unmasking of Medicine, George, Allen & Unwin, London.
5. Department of Health (2010) Equity and Excellence: Liberating the NHS, The Stationery Office, London.
6. The King's Fund (2004) On being a doctor: redefining medical professionalism for better patient care, King's Fund, London.
7. General Medical Council (2006) Good Medical Practice, GMC, London.

MLT Research Methods

<b>MLT Research Methods</b>				
<b>Discipline</b>		<b>Public Health</b>		
<b>Department</b>		<b>Epidemiology and Biostatistics</b>		
<b>Course Title</b>		<b>MLT Research Methods</b>		
<b>Course code</b>		<b>ML712</b>		
<b>Prerequisite</b>		<b>Biostatistics</b>		
<b>Class</b>		<b>4<sup>th</sup> class</b>		
<b>Semester</b>		<b>7</b>		
<b>Study block</b>				
<b>Number of Credits</b>		<b>3</b>		
		<b>Lecture</b>	<b>2</b>	
		<b>Practical</b>	<b>1</b>	
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Demonstration</b>
	<b>Lecture</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>Basic concepts and application of Epidemiology</b>	Studying epidemiology; distribution and determinants of health status or event; the epidemiological approach: what, who, where, when, why; models of causation of diseases
<b>2</b>	<b>2</b>	<b>1</b>	<b>Basic concepts and application of Epidemiology</b>	Natural History of diseases; applications of epidemiology in public health: community health assessment and priority setting, evaluating health interventions and programs, preventing diseases and promoting health, improving diagnosis, treatment and prognosis of clinical diseases
<b>3</b>	<b>2</b>	<b>1</b>	<b>Epidemiological measures of health and diseases: Frequency</b>	Definition of a case; and measure of diseases frequency: prevalence, incidence, risk or cumulative incidence, odds and incidence rate
<b>4</b>	<b>2</b>	<b>1</b>	<b>Epidemiological measures of health and diseases: Frequency</b>	Uses of frequency measures and crude and specific rates: mortality rate

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<b>5</b>	<b>2</b>	<b>1</b>	<b>Epidemiological measures of health and diseases: association and impact</b>	Measures of exposure effect and impact: relative measures, risk ratio, rate ratio, odds ratio, absolute measures, attributable (absolute) risk, population attributable (absolute) risk and population attributable fraction
<b>6</b>	<b>2</b>	<b>1</b>	<b>Type of study: Descriptive study</b>	Type of study: case presentation, case series, ecological, cross sectional, case-control, cohort study, and intervention study
<b>7</b>	<b>2</b>	<b>1</b>	<b>Ecological studies</b>	What is an ecological study? Why study groups? Multi-group and time-trend studies, analysis and interpretation
<b>8</b>	<b>2</b>	<b>1</b>	<b>Cross-sectional studies</b>	What is a cross-sectional study? Descriptive and analytical studies Study design, sampling, data collection Analysis, and strengths and weaknesses
<b>9</b>	<b>2</b>	<b>1</b>	<b>Case-control studies</b>	Study design, hypothesis, selection of cases, selection of controls, and measuring exposures, Analysis and interpretation, bias, confounding, and strengths and weaknesses
<b>10</b>	<b>2</b>	<b>1</b>	<b>Cohort studies</b>	What is a cohort? Types of cohort study? Study design: selection of the study population, exposures, follow-up and outcomes, Analysis Strengths and weaknesses
<b>11</b>	<b>2</b>	<b>1</b>	<b>Intervention studies</b>	Types of intervention study, study design, selection of population, allocation of treatment regimens, efficacy and effectiveness, other types of study design
<b>12</b>	<b>2</b>	<b>1</b>	<b>Prevention strategies</b>	Preventive medicine, approaches to prevention, primary prevention, secondary prevention, tertiary prevention, and high risk strategies versus population strategies, Epidemiological surveillance and routine data, public health surveillance, communicable diseases, health center and hospital data, controlling age and other confounders, value of routine data
<b>13</b>	<b>2</b>	<b>1</b>	<b>Screening and diagnostic tests</b>	Definition and purpose of screening, mass or targeted screening, reliability and validity of

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				screening test, predictive value,
14	2	1	<b>Screening and diagnostic tests</b>	Ethics in screening and criteria for screening, Evaluating screening program: relative burden of diseases, feasibility, effectiveness, biases, cost and study design for evaluating screening
15	2	1	<b>Sampling methods</b>	None probability and probability sampling: simple random sampling, systematic sampling, stratified sampling and cluster sampling
16	2	1	<b>Sample size calculation</b>	Importance of sample size calculation, factors affecting sample size, sample size for surveys
<p>1 Lecture = 50 minutes Hour per week = 3 Total credit = 3</p>				

## GOAL

This course goals are the introduce of basics knowledge of epidemiology principle and its applications in research and biostatistics. Also how to apply a research with standard quantitative and qualitative methods and producer and at the end how to analyze it. Students will gain an overview of research intent and design, methodology and technique, format and presentation, and data management and analysis informed by commonly used statistical methods.

## Course objectives:

- ✓ To know the Basic concepts and application of Epidemiology.
- ✓ To know the Epidemiological measures of health and diseases: Frequency.
- ✓ To know the Type of study.
- ✓ To know common terms used in epidemiologic research.

## Skills:

At the end of this course, students able to:

- ✓ Apply practically case presentation, case series, ecological, cross sectional, case-control, cohort study, and intervention study.
- ✓ Apply practically sample method and sample size calculation.
- ✓ Define and compare the major study designs used in epidemiologic research, their strengths and limitations.
- ✓ Explain the epidemiological principles underlying screening, diagnostic testing, and decision analysis, and give practical interpretations of the results of these tools as they relate to individual patients.
- ✓ Discuss confounding and its effect on the interpretation of study results.

## Teaching and learning strategies:

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- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Role play
- ✓ Self- study

**Evaluation:**

- ✓ Written final examination ..... 80%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

Toxicology

<b>Toxicology</b>				
<b>Discipline</b>		<b>Clinic</b>		
<b>Department</b>		<b>Forensic Medicine and Toxicology</b>		
<b>Course Title</b>		<b>Toxicology</b>		
<b>Course code</b>		<b>ML713</b>		
<b>Prerequisite</b>		<b>Clinical Biochemistry 3</b>		
<b>Class</b>		<b>4</b>		
<b>Semester</b>		<b>7</b>		
<b>Number of Credits</b>		<b>3</b>	<b>Theory</b>	<b>2</b>
			<b>Practical</b>	<b>1</b>
<b>Weeks</b>	<b>Hours</b>		<b>Topics</b>	<b>Descriptions</b>
	<b>Theory</b>	<b>Practical</b>		
<b>1</b>	<b>2</b>	<b>1</b>	<b>Introduction</b>	Orientation, Introduction and brief history of toxicology
<b>2</b>	<b>2</b>	<b>1</b>	<b>Fundamental of toxicology</b>	Modern toxicology laboratory, Human resource,
<b>3</b>	<b>2</b>	<b>1</b>	<b>Sample analysis</b>	Procedures for collecting preservation and forwarding of biological sample for toxicology analysis
<b>4</b>	<b>2</b>	<b>1</b>	<b>Methods</b>	Extraction/Isolation and cleanup methods
<b>5</b>	<b>2</b>	<b>1</b>	<b>Methods of tests</b>	Screening/spot/color tests for different persons/pesticide/ insecticides, volatile, cyanide, Tranquilizers, Barbiturates, Alkaloids, metallic, acid and base, Toxic anion, plant poisons
<b>6</b>	<b>2</b>	<b>1</b>	<b>Principles of chromatography</b>	Thin layer chromatography and its application

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7	2	1	<b>Chromatography</b>	Gas chromatography
8	2	1		HPLC ( High performance liquid chromatography
9	2	1	<b>Spectroscopy</b>	Ultraviolet – visible spectroscopy and its application
10	2	1	<b>Spectroscopy</b>	Atomic absorption spectroscopy and its application
11	2	1	<b>Polarography</b>	Voltammetry/ Polarography trace meta-analysis and its application
12	2	1	<b>Microwave</b>	Microwave digestion system and its application
13	2	1	<b>Alcohol analyzer</b>	Breath alcohol analyzer and its application
14	2	1	<b>Reporting</b>	Toxicology reporting and interpretation
15	2	1	<b>Poisoning death</b>	Do and do not different personnel involved in crime investigation of poisoning death
16	2	1	<b>Safety measures</b>	Safety measures in the toxicology laboratory

1 Lecture = 50 minutes  
Hour per week = 3  
Total credit = 3

### **Goal**

Describing the fundamentals of the toxicology, sample analysis and Principles of chromatography.

### **COURSE OBJECTIVE:**

This course provide an introductory overview of the field of toxicology covering the basic principles, target organ toxicity, the toxicity of a limited group of compounds, and an introduction to modern molecular toxicology. The principal learning objective is for the students to gain familiarity with basic building blocks of toxicology, to enable them to subsequently build a more detailed knowledge of those particular aspects of toxicology that interest them.

### **COURSE DISRIPTION:**

Described above in the table.

### **SKILLS**

After completion of this course students will be able to:

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- ✓ Describe basic toxicological principles and describe how different chemicals are taken up by, processed in and eliminated from the body;
- ✓ Describe different the importance of different organs for detoxification/ toxification of chemicals, and describe mechanisms for chemically induced neurotoxicity and endocrine toxicity;
- ✓ Describe different behaviour tests and their importance to discover of different neurological and endocrinological disturbances;
- ✓ Describe when different chemicals are most toxic, and mechanisms behind the effects. Be able to discuss when and how different chemicals can interact under the development to induce effects;
- ✓ Describe different genetic testing methods and injuries after various types of ionising radiation;
- ✓ Apply different toxicological frameworks within the professional disciplines and have awareness about different risk assessment criteria;
- ✓ Perform any tests and experiments in toxicology field.

**TEACHING AND LEARNING STRATEGIES:**

- ✓ Lecture
- ✓ Class and small group discussion
- ✓ Laboratory experiments
- ✓ PBL&CBL
- ✓ Audio-visual aids
- ✓ Role play
- ✓ Self- study

**EVALUATION:**

- ✓ Written final examination 60%
- ✓ Skills lab examination 20%
- ✓ Class activity, tests during the semester, attitude in contributing to group work 20%

**Reference**

1. Jaswal At,Mio Tabin. Handbook of analytical Toxicology published by Jaypee brother Medical books
2. WHO, international program and chemical safety. Basic analytical Toxicology , 1996-2015



Nutrition

Nutrition					
Discipline		Public Health			
Department		Nutrition			
Course Title		Nutrition			
Course code		ML715			
Prerequisite		General Biochemistry & physiology			
Class		4			
Semester		7			
Number of Credits		2		Theory	2
				Practical	0
Weeks	Hours		Topics	Descriptions	
	Theory	Practical			
1	2		Energy	1. Energy requirements, intake and expenditure 2. Methods to assess energy expenditure 3. Factors influencing energy expenditure 4. Deficiency and excessive intakes	Interactive Lectures
2	2		Macronutrients	1. Classification of macronutrients (carbohydrates and fibers = CHO, proteins = Pro, and lipids) 2. Dietary sources of macronutrients 3. Overview of digestion, absorption and metabolism (CHO, Pro, and Lipid)	Interactive Lectures
3	2		Macronutrients	4. Functions (CHO, Pro, and Lipid) 5. Dietary reference intakes 6. Macronutrients in health and diseases	Interactive Lectures
4	2		Micronutrients- vitamins	1. Structure, functions, dietary sources, metabolism and assessment of status of vitamins A <sup>1</sup> , D <sup>2</sup> , E and K with emphasizing on night blindness	Interactive Lectures

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5	2		<b>Micronutrients- vitamins</b>	2. Structure, functions, dietary sources, metabolism and assessment of status of vitamins B1, B2, B3, B6, B9, B12, C and others	Interactive Lectures
6	2		<b>Micronutrients- minerals</b>	1. Structure, functions, dietary sources, metabolism and assessment of status of calcium, iron, zinc, magnesium and selenium 2. Structure, functions, dietary sources, metabolism and assessment of status of sodium, potassium, chloride and others	Interactive Lectures
7	2		<b>Current Food Guide Pyramid, Dietary Guidelines, Dietary Reference Intake (DRI)</b>	1. Food Guide pyramids 2. Main concept of DRI 3. Guidelines for healthy eating 4. General introduction of Afghanistan FBDG	Interactive Lectures /PBL
8	2		<b>Water and electrolyte balance</b>	1. Water and important electrolytes (Na, K, Cl) 2. Common rehydration therapy solutions 3. Acidosis (respiratory and metabolic) 4. Alkalosis (respiratory and metabolic)	Interactive Lectures
9	2		<b>Nutritional support (enteral and parenteral nutrition) and nutritional care in surgery and metabolic stress</b>	1. Rationale and criteria for appropriate nutrition support 2. Enteral Nutrition (EN)/Enteral Nutrition Access 3. EN: Formula characteristics, 4. EN: Equipment's and delivery methods 4. EN: Common complication 5. Parenteral Nutrition(PN)/Parenteral Nutrition Access	Interactive Lectures
10	2		<b>Nutritional support (enteral and parenteral nutrition) and nutritional care in surgery and metabolic stress</b>	6. PN: Chatter placement 7. PN: Composition of PN formula 8. PN: Common complication 9. Reseeding Syndrome 10-HEN/HPN/ Long term nutrition support 11. Metabolic stress definition and diagnosis	Interactive Lectures
11	2		<b>Nutritional support (enteral and parenteral nutrition) and nutritional care in surgery and metabolic stress</b>	12. Assessment of biochemical and anthropometric and nutritional parameters in patients 13. Nutrition Therapy for burn and surgeries 14. Method of Feeding (EN and PN) 15.Refeeding syndrome 16. Nutrition Therapy for respiratory stress	Interactive Lectures
12	2		<b>Nutrition in Infancy</b>	1. Physiologic Development 2. Nutrient Requirements 3. Breastfeeding	Interactive Lectures /TBL

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<b>13</b>	<b>2</b>		<b>Nutrition in Infancy</b>	4. Complementary nutrition 5. Methods for improving growth and development in children 6. Medical Nutrition Therapy in LBW (NICU)	Interactive Lectures /TBL
<b>14</b>	<b>2</b>		<b>Nutrition in Aging</b>	1. Physiologic changes 2. Nutritional requirements 3. Key nutrient requirements 4. Common problems in elderly people	Interactive Lectures /TBL
<b>15</b>	<b>2</b>		<b>Nutrition in Aging</b>	1. Physiologic changes 2. Nutritional requirements 3. Key nutrient requirements 4. Common problems in elderly people	Interactive Lectures /TBL
<b>16</b>	<b>2</b>		<b>Nutrition in Aging</b>	1. Physiologic changes 2. Nutritional requirements 3. Key nutrient requirements 4. Common problems in elderly people	Interactive Lectures /TBL
<p>1 Lecture = 50 minutes Hour per week = 2 Total credit = 2</p>					

### Goal

The goal of this course is to familiarize the students in allied health with the general nutritional principles as well as dietary guidelines for specific age groups.

### COURSE OBJECTIVE:

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

1. Understand and explain the fundamental concepts of basic nutrition (energy, macronutrients, micronutrients)
2. Understand and explain food-based dietary guidelines.

### SKILLS

After completion of this course students will be able to:

- ✓ Methods to assess energy expenditure .
- ✓ Methods for improving growth and development in children.

### TEACHING AND LEARNING STRATEGIES:

Interactive Lectures  
Team-Based Learning (TBL)  
Problem-Based Learning (PBL)  
Group Discussion

### EVALUATION:

Formative exams during the semester	<b>10%</b>
Group working and presentations	<b>10%</b>

**First Revision -2018 Kabul University of Medical Science  
Curriculum of Medical laboratory Technology**

Midterm examination	20%
Final summative exam	60%
Total score	100%

## Reference

1. Mahan LK, Raymond JN. Krause's Food & the Nutrition Care Process, 14th Edition. Loise Missouri, Elsevier. 2017.
2. [Escott-Stump](#) S. Nutrition and Diagnosis-Related Care. 8<sup>th</sup> Edition. Lippincott Williams & Wilkins. 2016.
- 3- تغذیه در دوران مختلف زندگی- ترجمه دکتر فریبا کوهدانی و دکتر گیتی ستوده- انتشارات رویان پژوه- سال چاپ 1392

**The Members of the curriculum:**

- 1- Professor Shamsurrahim Rahim Administrative Deputy of KUMS.
- 2- Associate professor Dr. M.Farid Barnayar Head of the EDC.
- 3-Associate professor Dr. Breshna Dawlati Lecturer of the Biochemistry Department.
- 4-Teaching assistant Dr. Mahdawi Joya Head of MLT Department.
- 5- Teaching assistant M.Reza Abdullahi member of MLT department
- 6- Teaching assistant Master Ruhullah Vasiq member of MLT department
- 7- Teaching Assistant Khalid jan Rezayee member of MLT Department.





**Approval of the university scientific council date(      )Protocol Number(      )**

**The final comment of educational national curriculum commission**