الجمهـــورية اليمنيـــــة

جامعـــة السعـــيد

Syllabus of

Medical Laboratory Science

Bachelor-B.Sc.

Four Years Academic System

2012-2019

برنامج بكالوريوس علوم المختبرات الطبية
جامعة السعيد- كلية الطب والعلوم الصحية
قسم المختبرات الطبية

رؤية جامعة السعيد:

مؤسسة تعليمية أهلية ، تتطلع إلى أن تكون جامعة رائدة وأعداد القوى البشرية، الوسطية والاختصاصية القادرة على المنافسة للحصول على فرص العمل، محليا وإقليميا في ضوء معايير الجودة الأكاديمية.

رسالة الجامعة:

تسعى جامعة السعيد الى الإسهام في إعداد قوى بشرية، وسطية واختصاصية، يتطلبها المجتمع ومؤسسات سوق العمل من خلال إيجاد شراكة فعالة بينهما وتوجيه أنشطة خدمة المجتمع والبحث العلمي نحو القضايا والمشكلات المعاصرة التي لها الأولية و إيجاد الحلول المناسبة لها.

مقدمة

أن التقدم العلمي والطبي المطرد الذي يشهده العالم من حولنا وخاصة في العلوم الطبية التشخيصية المخبرية والتي تعتمد اعتماداً كلياً في نجاحها على الفريق الطبي المتكامل والذي لابد أن يكون على مستوي عال من الخلفية العلمية والعملية والتدريبية يؤدي كل منهم دوره بكفاءة ومهارة عالية والعمل كفريق واحد، فقد أهتم البرنامج بترسيخ قيم التقنيات الحديثة وإيجاد كوادر طبية فنية وتقنية متوسطة واختصاصية بما له دور أكيد في تحسين الأداء الطبي وجودة العناية الصحية بالمريض وبما يواكب المتغيرات المتلاحقة التي تحتاجها سوق العمل والإسهام في تحديد وحل المشاكل الصحية بتقديم المعلومات الموثوقة في المجال الصحي التقني والاختصاصي..

رؤية القسم

أن نكون الأفضل في إعداد الكوادر المتخصصة في مجال المختبرات الطبية على مستوى اليمن .

رسالة القسم

رفد المجتمع بالكوادر المتخصصة في مجال المختبرات الطبية بإكسابهم المعارف والمهارات والقدرات التنافسية اللازمة للإسهام في خدمة المجتمع من خلال توفير الإمكانات والبيئة التعليمية اللازمة.

أهداف القسم:

١- تخريج كوادر وطنية متميزة تملك المعارف والمهارات اللازمة للعمل كأخصائيي مختبرات طبية.
٢- تربية الطالب على السلوكيات والأخلاق المهنية القويمة .
٣- تأهيل الطالب بالمهارات العلمية والعملية للعمل على الأجهزة التشخيصية المتطورة وضمان إدارة الجودة بالمختبرات.
٤- تنمية الوعي الصحي بالمجتمع والتوعية حول الأمراض المعدية والمتوطنة في تعز بصفة خاصة وباليمن بصفة عامة.
٥- الاسهام في تطوير مستوى التعليم في مجال المختبرات الطبية والتقنيات المخبرية من خلال دعم حركة البحث العلمي وتوفير المتطلبات اللازمة لذلك.

مواصفات مخرجات التعلم في قسم المختبرات الطبية.

١- يطبق بدقة المعلومات والمهارات المهنية لضمان إخراج تقارير ونتائج مخبرية دقيقة تتناسب مع حالة المريض.
٢- يتابع كل حديث في تخصصة.
٣- يقيم الموقف بدقة متناهية.
٤- يطبق المفاهيم والأساليب البحثية والتكنولوجية في التخصص.
٥- يمارس المفاهيم والأساليب البحثية والتكنولوجية في التخصص.
٦- يطبق معايير السلامة المهنية والقواعد الحكومية المتبعة في مجال المختبرات الطبية .
٧- يطبق المعايير الأخلاقية والمهنية الدولية في تخصصة ، ويحترم أخلاقيات المهنة التي ينتمي إليها ويسعى للحفاظ عليها.
٨- يتواصل مع الأخرين ويظهر مهارات الاتصال لتوضيح دور الطب المخبري لحماية الإنسان من الامراض.
٩- يعرف واقع قطاع المختبرات الطبية والطب المخبري ويلم بكل أنواع الأمراض وانعكاساتها على حالة الأنسان.
١٠-يكون ملم بالأمراض المشتركة بين الإنسان والحيوان ويحافظ على الصحة العامة وصحة البيئة.
١١-يتمتع بكل مهارات التواصل بينة ومجتمع المستشفى والمراكز الصحية (الطبيب والمريض والزملاء والأداريين والمرافقين والقيادات)
١٢-يستطيع القيام بالأبحاث العلمية في مجال المختبرات الطبية التي تخدم المجتمع.

الخطة الدراسية لبكالوريوس علوم المختبرات الطبية
٢٠١٢ـ ٢٠١٦

	م	الفصل الأول					الفصل الثاني				
		اسم المقرر		عدد الساعات		المعتمد	اسم المقرر		عدد الساعات		المعتمد
				ن	عـ				ن	عـ	
السنة الأولى	١	لغة عربية١	Arabic language	2		2	ثقافة إسلامية	Islamic Culture	2		2
	٢	انجليزي (١)	English (1)	2		2	لغة انجليزي (٢)	English (2)	2		2
	٣	حاسوب (١)	Computer (1)	2	2	3	حاسوب (٢)	Computer (2)	2	2	3
	٤	إسعافات أولية	First Aid	1	2	2	لغة عربية٢	Arabic language	2		2
	٥	بيولوجي	biology	2	2	3	فيزياء طبية	Med. Physics	2	2	3
	٦	كيمياء عامة وفيزيائية	Gen. and physical Chemistry	2	2	3	تقنية مختبرات	Laboratory technique	2	2	3
	٧	مهارات حياتية	Life skills	2		2	تشريح	Anatomy	2	2	3
		إجمالي عدد الساعات		13	8	17	إجمالي عدد الساعات		14	8	18

	م	الفصل الأول					الفصل الثاني				
		اسم المقرر		عدد الساعات		المعتمد	اسم المقرر		عدد الساعات		المعتمد
				ن	عـ				ن	عـ	
السنة الثانية	١	فسلجة إنسان	Human Physiology	2		2	علم الأمراض	pathology	2	2	3
	٢	علم أنسجة	Histology (Descriptive)	2	2	3	أوليات طبية	Medical protozoology	2	2	3
	٣	علم ديدان	Helminthology	2	2	3	علم المناعة	Basic Immunology	2	2	3
	٤	كيمياء حيوية (١)	Biochemistry (1)	2	2	3	كيمياء حيوية (٢)	Biochemistry (2)	2	2	3
	٥	ميكروبيولوجي عام	General Microbiology	2	2	3	بكتيريا طبية (١)	Medical bacteriology (1)	2	2	3
	٦	كيمياء تحليلية	Analytical Chemistry	2	2	3	علم دم (١)	Hematology (1)	2	2	3
		إجمالي عدد الساعات		12	10	17	إجمالي عدد الساعات		12	12	18

	م	الفصل الأول						الفصل الثاني					
		اسم المقرر		عدد الساعات			المعتمد	اسم المقرر		عدد الساعات			المعتمد
				ن	عـ					ن	عـ		
السنة الثالثة	١	بكتيريا طبية (٢)	Medical bacreriology(2)	2	2		3	حشرات طبية	Entomology	2	2		3
	٢	علم دم (٢)	Hematology (2)	2	2		3	علم دم (٣)	Hematology (3) (Coagulation)	2	2		3
	٣	هرمونات	Hormons	2			2	كيمياء سريريه (١)	Clinical chemistry-(1)	2	2		3
	٤	بنك دم	Blood bank	2	2		3	تحليل سوائل الجسم	Body fluid	2	2		3
	٥	فطريات طبية	Medical Mycology	2	2		3	فيروسات طبية	Medical Virology	2	2		3
	٦	وبائيات	Epidemiology	2			2	ميكرو ماء وغذاء	Food and Water microbiology	2	2		3
	٧	بيولوجي جزيئي	Molecular biology	2			2						
		إجمالي عدد الساعات		14	8		18	إجمالي عدد الساعات		12	12		18

	م	الفصل الأول						الفصل الثاني					
		اسم المقرر		عدد الساعات			المعتمدة	اسم المقرر		عدد الساعات			المعتمدة
				ن	عـ					ن	عـ		
السنة الرابعة	١	تشخيص طفيليات	Diagnostic parasitology	2	2		3	مشروع تخرج	Graduation project	2			2
	2	تشخيص دم	Diagnostic Hematology	2	2		3	ضبط جودة مختبرات	Laboratories Quality control	2	-		2
	3	تشخيص احياء دقيقة	Diagnostic Microbiology	2	2		3	حلقات نقاش المختبرات الطبية	Medical laboratory Seminars	2	-		2
	4	طرق بحث وأحصاء حيوي	Research methodology and biostatistics	2	-		2	علم السموم	Toxicology	2	-		2
	5	أخلاقيات المهنة	Ethics	2	-		2	تشخيص مناعة	Diagnostic immunology	2	2		3
	6	كيمياء سريرية (٢)	Clinical chemistry-(2)	2	2		3						
		إجمالي عدد الساعات		12	8		16	إجمالي عدد الساعات		10	2		11

أجمالي عدد الساعات المعتمدة : ١٣٣ - ساعة أكاديمية

الدورات الإكلينيكية خلال السنة الدراسية:

الدورات الإكلينيكية خلال السنة الدراسية		
الفترة	Course	المواد الدراسية
٤ اسابيع	Clinical Rotation – Hematology	دورات إكلينيكية
٤ اسابيع	Clinical Rotation – Clinical Chemistry	دورات إكلينيكية
٣ اسابيع	Clinical Rotation – Immunology	دورات إكلينيكية
٤ اسابيع	Clinical Rotation – Microbiology	دورات إكلينيكية
٣ اسابيع	Clinical Rotation – Blood Bank	دورات إكلينيكية
اسبوع	Clinical Rotation – Parasitology & Urinalysis & Body Fluid	دورات إكلينيكية
اسبوع	Clinical Rotation – Histology & Cytology	دورات إكلينيكية
اسبوع	Clinical Rotation – Molecular Biology (Elective)	دورات إكلينيكية
٢١	المجموع	

فهرس الصفحات

فهرس الصفحات

SYLLBUS OF

FIRST SEMESTER-

FIRST YEAR

Course title	**Arabic language**
Course code	**SUR111**
Level/ Semester	**L1 /s1**
Crated hours	**2 hours**
Course Description	يتناول المقرر أهمية اللغة العربية كوسيلة اتصال من الضروري تعلمها بشكل صحيح انطلاقا من قواعدها النحوية و الصرفية و الإملائية للوصول إلى قراءة علمية جيدة و صحيحة
Objectives	• يهدف المقرر إلى تنمية المهارات اللغوية لدى طلاب الجامعة. • تدريبهم على استخدام اللغة العربية استخداماً صحيحاً. قراءة وكتابة وتحديثاً.
learning outcomes:	**المخرجات المتوقعة لهذه المادة:** يتوقع أن يلم الطالب لدى انتهائه من دراسة هذه المادة بالمعارف والخبرات الآتية: **أ- معرفية :** - التعرف على أهمية اللغة العربية ودورها العقدي والتاريخي والحضاري. - الاطلاع على مجموعة من النصوص المختارة من القران الكريم والحديث النبوي الشريف والأدب العربي (شعراً ونثراً). - معرفة القواعد الأساسية في علم الصرف. **ب- علمية :** - معرفة القواعد الأساسية في الإملاء والترقيم والمعلومات والتي تمس حاجته إليها. **ت- مهارات شخصية و تحمل المسؤولية:** - اكتساب القدرة على كتابة اللغة العربية بشكل صحيح يساعد على تنمية الثقة بالنفس. - التدرب على الاستخدام الصحيح للغة العربية فرديا و اجتماعيا. – اكتساب القدرة على القراءة الصحيحة لمختلف أنواع النصوص العربية. **ث- مهارات التحليل و الاتصال:** - اكتساب القدرة على فهم و تحليل مختلف قواعد اللغة العربية.

- التدرب على التحليل العلمي و المنطقي بناء على قواعد مبنية مسبقا. **طرق التقييم للعناصر الرئيسية السابقة :** يتم التقييم من خلال الاختبارات الدورية والنهائية إضافة إلى بعض التكاليف من قبل أستاذ المادة ومناقشة الطلاب فيما يكلفون به . **الكتاب المقرر:** (المهارات اللغوية "المستوى الأول")	
١- **الوحدات الأولى** : مقدمات. – أهمية تعلم اللغة العربية واستخدامها . - اللغة كوسيلة اتصال : تعريف عملية الاتصال، مفهوم وطبيعتها عناصر الاتصال ، وظائف اللغة . - القراءة: تعريفها ، أهميتها ، أهدافها ، أنواعها. **٢- الوحدات الثانية :** القواعد النحوية الأساسية. - أقسام الكلمة: الاسم،والفعل، والحرف . - الإعراب والبناء: - أنواع الإعراب والبناء، الإعراب الظاهر والمقدر والمحلي. - المبني والمعرب من الأسماء. - المبني والمعرب من الأفعال . - علامات إعراب الأسماء الفرعية (الأسماء الخمسة، المثنى، جمع المذكر السالم ،الممنوع من الصرف). - الجملة الاسمية: المبتدى والخبر ، أنواع الخبر ، الأفعال الناسخة ، الحروف الناسخة . - الجملة الفعلية: الفعل ، الفاعل ، نائب الفاعل ، المفعول به . - العدد. **٣- الوحدات الثالثة :** القواعد الصرفية الأساسية. - المجرد والمزيد من الأفعال والأسماء. - كيفية التثنية والجمع .	**Topics**

٤- الوحدات الرابعة : الرسم الكتابي . - تطبيقات إملائية على أهم الموضوعات التالية: - كتابة الهمزة المتوسطة والمتطرفة. - همزة الوصل وهمزة القطع. - التاء المربوطة والتاء المفتوحة. - علامات الترقيم . **٥- الوحدات الخامسة :** - النصوص. - المعاجم	

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 30%
٢	عرض بوربوينت	٢	اختبار نهائي ٧٠%
٣	التطبيقات العملية	٣	إجمالي ١٠٠%

المراجع:

- كتاب الشامل في اللغة العربية الطبعة الأولى ٢٠٠٣

د. عبدالله محمد النقراط

٢- المهارات اللغوية "المستوى الأول

Course title	**English**
Course code	**SUR112**
Level/ Semester	**L1 /s1**
Crated hours	**2**
Course Description	This course is design to assist student to gain necessary knowledge and skills in order to use grammar ability to perform his/her duties in English language.
Objectives	By the end of this course the student will be able to:- 1. Recognize grammatically correct words/sentences from wrong once. 2. Write grammatically correct words/sentences.
learning outcomes:	Upon completion of the course, the learners will be able to: A. Knowledge: have grasped form, meaning and pronunciation of the Target Language (TL). advance linguistic competence to deal with lexical items in TL. B. Cognitive Skills: write coherent and correct paragraphs to describe places, express opinions , give reasons and give arguments. expand and consolidate techniques of manipulating diverse materials. enhance linguistic competence to deal with more complex functions of language such as, organizing, synthesizing, and evaluating information correlate and compare readings.

	C. Interpersonal skills and responsibilities hold and sustain small conversations, ask for and give explanations, make suggestions and ask for and give examples and arguments.
Topics	*Introduction to the course:-* • Its aim and objectives, various books required for the purpose.
	Grammar (1)Nouns and pronouns):- • Definition with examples • kinds of Nouns, the use of personal • and possessive nouns. • Practical to pick out the nouns and • pronouns from the given sentences.
	Verb and Adverb: • Definition with examples • Kind of verbs , the use of linking verbs • The formation of simple and negative sentences with linking verbs. • - The use of transitive and intransitive verbs.
	Adjective:- • Definition with examples • Kinds of adjectives • -Significance of adjective in a sentence • - Practice to pick out adjectives from a given sentence.
	Preposition & Conjunction :- • Definition with examples • Their significance in a sentence • Practice fill the blanks with suitable • Preposition
	(i)Voice - Active voice and passive voice • Rewrite the given sentences in passive voice, Exercises. (ii) Parts of Speech : Different types • How to use these in Sentences • Exercises • Direct and indirect speech

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	**1**	Lectures
2	Final Exam 70%	**2**	PPT Slides
3	Total 100%	**3**	Exercises Practical

Reference:

- **English language books.**

Course title	**Computer**
Course code	**SUR113**
Level/ Semester	**L1 /s1**
Crated hours	**3 hours**
Course Description	
Objective	**التعرف على مكونات الحاسوب ووظائف هو استخدامه.** **التعرف على تكنولوجيا المعلومات والمصطلحات المستخدمة في هذا المجال.** **استخدام النظام MS-DOS ونظام التشغيل MS-Windows.** **استخدام محرر النصوص MS-WORD.**

learning outcomes:

الرمز والرقم	أ-المعرفة و الفهم
أ.١-	فهم أساسيات علوم الحاسوب وبنية الحاسوب والشبكات ووظائف أنظمة التشغيل.
أ.٢-	التعرف على مفهوم تكنولوجيا المعلومات ومفهوم التجارة الإلكترونية وأنواعها.
أ.٣-	التعرف على مكونات وأوامر نظام التشغيل DOS ونظام التشغيل Windows .
أ.٤-	فهم أدوات وإمكانيات محرر النصوص MS-Word

الرمز والرقم	ب – المهارات الذهنية
ب.١-	القدرة على التمييز بين مكونات الحاسوب المادية والبرمجية وأقسامها المختلفة.
ب.٢-	القدرة على إعداد بيئة عمل جيدة تتوافر فيها عوامل الصحة والأمان.
ب.٣-	تشخيص المشكلات وإيجاد الحلول للمشاكل المادية والبرمجية.
ب.٤-	القدرة على التعامل مع محرر النصوص MS-Word.

الرمز والرقم	المهارات المهنية والعملية – ج
ج.١-	حل المشاكل المتعلقة بنظام التشغيل Windows .

ج.٢-	كتابة الأبحاث وتصميم الصحف والمجلات .
ج.٣-	القدرة على التعامل مع الحاسوب باستخدام نظام التشغيل DOS و Windows
ج.٤-	القدرة على التمييز بين مكونات الحاسب .

الرمز والرقم	د – المهارات العامة
د.١-	مهارات التعامل مع الحاسب الآلي .
د.٢-	مهارات العمل في السكرتارية .
د.٣-	مهارات تنسيق الأبحاث والصحف والإعلانات .
د.٤-	مهارات التعامل مع إعدادات أنظمة التشغيل DOS &Windows .

Topics

	الموضوعات الرئيسية للمقرر
١.	أساسيات الحاسوب
٢.	تكنولوجيا المعلومات
٣.	Ms Dos
٤.	أساسيات النظام ويندوز وسطح المكتب وقائمة أبدأ
٥.	التعامل مع الملفات والمجلدات والأقراص
٦.	البرامج الملحقة وبرنامج الرسام
٧.	أساسيات البرنامج وكتابة المستندات في Ms Word
٨.	تعديل المستندات وتنقيحها
٩.	تنسيق الفقرات والنصوص
١٠.	تنسيق الصفحات
١١.	إدراج الأشكال والصور
١٢.	الجداول
١٣.	الجداول

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 20%
٢	عرض بوربوينت	٢	عملي40%
٣	التطبيقات العملية	٣	اختبار نهائي 40%
	ـــــ	٤	إجمالي ١٠٠%

المراجع :

- قائمة بالمراجع الرئيسة المستخدمة للتعليم والتعليم :

١- كتاب مقرر:..الحاسوب (مبادئ – أنظمة – تطبيقات -أنترنت)م/فهد الوصابي

٢- كتب مقترحة:..الحاسوب والبرمجيات الجاهزة- دار وائل...

- Lagrange and Nancy Lang
- Fowth edition , 2000 by hall, Inc, new jersey- Ust
- Windos 2000 for dummices
- Andy Rath bone – 1998 by ID6 books

Won wide, Inc USA

Course title	**Biology**
Course code	**MCR114**
Level/ Semester	**L1 / s1**
Crated hours	**3 hours**
Course Description	The course includes concepts of biology; water and the fitness of the environment; the structure and function of macromolecules, cellular organelles and membrane; metabolism "cellular respiration and photosynthesis"; Mendelian genetics; molecular basis of inheritance; from gene to protein "gene expression"; viruses and biotechnology.
Objectives	The course will provide the students with the basic understanding of the fundamental principles of biology. The topics covered in this course will allow the students to better comprehend other courses during the following academic years. The course will provide the students with the basic understanding of the fundamental principles of practical biology. The topics covered in this course will allow the students to better comprehend other practical courses during the following academic years.
learning outcomes:	**Knowledge and understanding** At the end of this module, students able to: Follow and apply the laboratory safety rules during the

	laboratory time. * Describe the characteristics and compounds that make up living things * Discuss how matter and energy are interrelated in photosynthesis and cell respiration. * Identify key cell organelles and relate their function and structure. * Compare and contrast mitosis and meiosis in term of their goals and outcome. ***** Gain knowledge of the anatomical structure and physiological functions of tissues and organ systems of the human. **Cognitive skills (thinking and analysis).** - The Thinking and Meditation about the Great Ability of God in Creation of our body and the biological systems. - The thinking skills will be developed by encouraging students to conclude answers to different questions that the instructor intends to use during the presentation of the scientific material. - The instructor intends to stimulate the student's analytical thinking side via connections with general aspects in daily life or through questions, net searching, and home works. **Communication skills (personal and academic).** - Gain Teamwork skills - The students have the option to share open discussion and to ask questions during the class or any other times. - Students have the opportunity to communicate with others especially professors, while searching answers for home works

	or through encouraging them to attend different scientific activities that are available in the department.
Topics	❑ Course content 1- What is biology? What is life? Fields of biology - Life characteristics. 2- The living cell: (Differences between prokaryotic and eukaryotic cells). 3- Cell structure and cell organelles: (Plasma membrane - nucleus - endoplasmic reticulum - mitochondria - ribosomes - lysosomes - Golgi apparatus - centrosome - microfilaments - microtubules). 4- Chemistry of living substance: (Elements - major, minor and trace elements - Compounds: water, carbohydrates, lipids, proteins and nucleic acids). 5- Exchange across the cell membrane: (Simple diffusion - facilitated diffusion - osmosis - filtration - active transport - endocytosis - exocytosis). 6- Cell energetics: (Living systems and the two laws of thermodynamics - exergonic and endergonic reactions - spontaneous and nonspontaneous reactions - energy of activation - effect of temperature and enzymes on activation energy). 7 Energy release: (Adenosine triphosphate and adenosine diphosphate, glycolysic, TCA cycle and oxidative phosphorylation -(electron transport system). 8 Gas exchange in animals: (Organs of respiration - lungs,

gills and tracheae - exchange of O_2 and CO_2 across the respiratory surfaces - comparison between aerial and aquatic respiration - inspiration and expiration in pulmonary respiration - lung volumes and capacities - control of respiration - neural and chemical).

9 Transport of gases in animals: (Transport of oxygen - respiratory pigments in animals with special emphasis on hemoglobin - oxygen dissociation curve -transport of carbon dioxide).

❑ Practical Parts:

Course module description:

Includes laboratory safety rules; types and use of microscopes; experiments on detection of carbohydrates, lipids, proteins. Enzymes and the effect of physical factors; prokaryotic and eukaryotic cells; cell division and genetics.

- Contents:

1- Instructions and Laboratory safety rules.

2- Macromolecules

a- Carbohydrates- Benedict's test for reducing sugars- Iodine test (Lugol's test) for starch

b- Proteins- Ninhydrin test for amino acid- Biuret test for polypeptides.

c- Lipids- Sudan red test for fats- Lipid solubility test

3- Types of the microscopes and. Proper use of a compound light microscopes

	4- Preparation of a wet mount:The Letter "e"- Pond water. **5-** Parts of a dissecting Microscope and. Using a dissecting microscope:- An insect- A bread mold **6-** Diffusion within solutions, Diffusion within semi-solid medium, Osmosis in plant cells (*Elodea* leaves) **7-** Enzyme invertase (sucrase), Rennin, catalase **8-** Effect of temperature pretreatment on enzyme activity **9-** Effect of pH changes on enzyme activity **10-** Cellular respiration **11-** Photosynthesis **12-** Mitosis in animal and plant cells **13-** Working with human phenotypes

Reference:

1. Neil A. Campbell and Jane B. Reece Edition: 8th edition (2008) Publisher: Benjamin Cumming's Publishing Company. ISBN:0-8053-7146-x
2. Karp, G. Cell and Molecular Biology, concepts and Experiments. 2002, 3rd edition,John Wiley publishing company, ISBN 0-471-38913-7.
3. Bruce, A., Bray, D., Hopkins, K., Johnson, A., Lewis, J., Raff, M., Roberts, K.,Walter, P. Essential Cell Biology. 2004. Garland Publishing company. ISBN: 0- 8153-3480-X.

Course title	**General and physics Chemistry**
Course code	**MCR116**
Level/ Semester	**L1 / s1**
Crated hours	**3 hours**
Course Description	These courses study the chemistry of carbon compounds and their properties, structures and reactions. It emphasizes the study of the principle classes of aliphatic and aromatic compounds, which in conjunction with selected experiments, gives an understanding of the mechanisms of organic reactions.
Objectives	1. To provide all knowledge about concept of chemistry and how to formed drug formula from individual atoms. 2. To provide the properties of the constituent atoms and how its influence by molecular structure and reactivity . 3. To understanding fundamental concepts of chemical bonds. 4. To gain knowledge about intermolecular active force. 5. To know how to nomenclature each group of organic chemicals
learning outcomes:	1. Describe basic chemical principles including the structure of the atom, chemical bonding and the periodic table, and also apply the concept of orbital hybridization 2. Describe the concept of functional groups and how these groups give rise to characteristic properties 3. Describe the stereoisomer. 4. Describe how the reactivity of organic compounds can be related to Lewis and hybridization models for bonding. 5. Describe the classification of organic molecules 6. Explain how to nomenclature of organic compounds. **Intellectual Skills** 1. Able to solve problem depend on given in formation 2. Nomenclature the different groups of compounds **Professional and Practical Skills** 1. Prepare different types of drugs from organic compounds

	2. Modify some compounds to get required group of drugs. **General and Transferable Skills** 1- Work in teams in researching groups 2 – Analyze and evaluate different data
Topics	**Introduction to general chemistry** Periodic table of elements • Mendeleev's periodic table • Modern periodic table. • **Ionic bonds, covalent bonds, metallic bonds**. • Lewis electron and orbital hybridization. • Vander Waals force • Hydrogen bonding force • Types of chemical bonds • Electro distribution in atoms • Intermolecular active force • **Types of Hydrocarbons** (aliphatic and aromatic), cyclic and uncyclic , saturated and unsaturated. stereoisomer's • **Classification of organic molecules** • Stereoisomer • Structure , reaction and nomenclature of aliphatic hydrocarbons, Alkanes, alkenes, alkynes, alcohol, ether, aldehydes, ketones, alky halides, carboxylic acids, amines • **Structure, reaction and nomenclature** of aromatic hydrocarbons, Benzene, phenol, halogen derivatives of benzene. • Structure , reaction and nomenclature of heterocyclic groups, amino acids and carbohydrates • Nomenclature of organic compounds> **Practical Part (Experiments)** • Recrystallization • Distillation • Chemically active extraction • Thin layer chromatography

	• Substitution • Elimination • Polymerization • Infrared spectroscopy • Nuclear magnetic resonance spectrometry • Index of refraction • Gas chromatography • Electrophilic aromatic substitution • Reduction/oxidation • Esterification • Aldol/Claisen condensation • Grignard reaction • Diels-Alder reaction • Unknown identification

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

Reference:

J. Olmsted, G. Williams, R.C. Burk; Chemistry, Canadian Edition. ISBN 9780470939451

Course title	**Life skills**
Course code	**SUR117**
Level/ Semester	**L1 /s1**
Crated hours	**2 hours**
Course Description	• تعريف الاتصال وطبيعته و مكوناته وأنواعه وعناصره ونماذجه وخصائصه وكفاءة الاتصال ودراسة بعض المفاهيم الخاطئة عن الاتصال، الإدراك الذهني ومفهوم الذات ، العلاقة بين الاتصال الكلامي والاتصال غير الكلامي، وكتابة السيرة الذاتية والمقابلة الشخصية،إعداد وكتابة الرسائل وأنواع التقارير.
Objectives	١- أن يكون الطالب قادرا على فهم العمليات الأساسية في الاتصال الإنساني، ويحفز قدراته ويعبر عن ذاته بشكل جيد وكيف يكون مستمعا جيدا بصفة فعالة. ٢- أن يكتسب الطالب مهارات اتخاذ القرار وأساليب حل المشكلات و العمل مع أناس من مختلف الثقافات. ٣- أن يعرف الطالب طبيعة الاتصال الجماهيري وكتابة السيرة الذاتية وأنواع التقارير
learning outcomes:	أ- **معرفية**: ١- التعرف على طبيعة الاتصال الجمعي وكيفية التخطيط له. ٢- يحفز قدراته ويجيد التعبير عن ذاته. ٣- التعرف علي مفهوم الاتصال في المجموعات الصغيرة وسبل تطويره. ب- **مهارات علمية**: ١- جعل الطالب قادرا علي استخدام الطرق الحديثة المتطورة والآليات والتي تمكنه من تطبيق مهارات الاتصال بسهولة. ٢- استخدام أساليب جدية تعتمد على التدريب والتقويم المتنوع والفعال. **ج- مهارات شخصية وتحمل المسؤولية**: ١- اكتساب مهارات العرض والإلقاء ومهارات التفاوض (الإقناع). ٢- إجادة مهارة الاستماع الفعال. ٣- اكتساب الطالب اتخاذ القرار وأساليب حل المشكلات. ٤- اكتساب الطالب مهارة المقابلة الشخصية والتحضير لها. **د- مهارات التحليل والاتصال**: ١- اكتساب مهارة تحديد الأهداف والتخطيط للمستقبل.

٢- ، اكتساب مهارة اتخاذ القرار وأساليب حل المشكلات	
- **مدخل الاتصال الإنساني**: تعريف الاتصال، مكونات عملية الاتصال، أنواع الاتصال، نماذج الاتصال، خصائص وكفاءة الاتصال، و بعض المفاهيم الخاطئة عن الاتصال. ٢ - **التواصل مع الذات**: كيف يكون الإدراك الذهني ؟ إدراك الذات، مفهوم الذات وطرق تحسينها. ٣- **الاتصال الكلامي:** الأهداف، عناصر اللغة وطرق تحسين الاتصال الكلامي. ٤-**الاتصال غير الكلامي**:تعريفه، أنواعه، صفاته والعلاقة بين الاتصال الكلامي وغير الكلامي. ٥-**الاستماع والسماع:**الفرق بينهما، مراحل عملية الاستماع، الاستماع النشط والاستماع السلبي وكيف تكون مستمعا جيدا؟ ٦-**الاتصال الشخصي وبناء العلاقات الإنسانية:** تعريفه، فوائده، صفاته الأساسية، مراحل تطور العلاقات الشخصية، الإفصاح عن الذات. ٧- **الاتصال في المجموعات الصغيرة:** أنواع وأهداف وأخلاقيات العمل في المجموعات الصغيرة وبناء الفريق وحل المشكلة واتخاذ القرار. ٨- **الاتصال مع الجمهور:** طبيعة الاتصال مع الجمهور. ٩- **السيرة الذاتية والمقابلة الشخصية**: كتابة السيرة الذاتية و إعداد وكتابة الرسائل وأنواع التقارير	**Topics**

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 30%
٢	عرض بوربوينت	٢	اختبار نهائي ٧٠%
٣	التطبيقات العملية	٣	إجمالي ١٠٠%

المراجع:

-د .أحمد ماهر، كيف ترفع مهاراتك الإدارية في الاتصال، الإسكندرية، الدار الجامعية، ٢٠٠٤ م.

- Margaret Lioyd and Robert Bor, "***Communication Skills in Medicine***",

Churchill Livingstone 2004.

Course title	**First aid**
Course code	**MCR115**
Level/ Semester	**L1/s1**
Crated hours	**3 hours**
Course Description	First Aid is the immediate care given to the injured or suddenly ill person. It is the temporary assistance that is rendered until competent medical care, if required, arrives and takes over. This is a basic program that will concentrate on the first five minutes of care. If your work or lifestyle places you in locations where the EMS (Emergency Medical Services) response time is questionable, we recommend that you participate in a first responder program.
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. Acquire knowledge of the basic first aid. 2. Understand the principles on which first aid treatment based. 3. Carry out the essential emergency treatment of an injury. 4. Apply the simple rules for dealing with a casualty before transporting to hospital. 5. Participate with other medical personnel in saving activities.
learning outcomes	• Knowledge and understanding - Recognize the importance of the well being of the emergency care - Demonstrate understanding of the pre-hospital & in-hospital triage system- - Identify the important nursing considerations during inter-facility and intra-facility transport of victim/ patient with emergency conditions - Demonstrate understanding of the important ethical and-legal issues encountered in dealingnwith victim / patient in emergency condition. • **Cognitive skills (thinking and analysis).**

	- Analyze the client condition according to triage system. - Synthesize critical thinking process when dealing with different types of emergency situations. - Recognize the first aid measures and nursing management for patients with trauma in the different body systems. - Identify first aid measures & nursing management for patient with the different medical emergencies as gastrointestinal bleeding, allergic hypersensitivity emergencies, toxicological emergencies and environmental emergencies **• Communication skills (personal and academic).** - Demonstrate understanding of effective communication with patients, families and healthcare team members. - Demonstrate understanding of the proper documentation of essential data pertinent to patient/victim condition or trauma. - Recognize the importance of supporting the family of victim/patient in emergency.
Topics	**• Practical and subject specific skills (Transferable Skills).** - Demonstrate professional documentation writing skills. - Demonstrate an understanding of use of problem solving skills when dealing with crisis **Course contents:** • **Introduction:** ❑ Concept & objectives of the first aide ❑ Responsibilities of the first aide • **Hemorrhage & cuts wounds:** ❑ External bleeding, internal bleeding and cuts wounds • **Shock:** ❑ Definition & types of shock and first aid treatment of shock

- Unconsciousness:

- Definition and first aid treatment of shock Unconsciousness
- Epileptic fits, definition ant first aid treatment
- Coma, due to hyperglycemic or hypoglycemic

- **Splints and bandage:**

- The aims of bandaging & splinting in first aid - the methods of apply bandages

- **Fractures & dislocation:**

- Definition, signs, types and symptoms of fracture; and the dislocation and the first aid treatment

- **Burns and scalds:**

- Heat burn and chemicals scalds and the first aid treatment

- **Asphyxia & cardiopulmonary restating (CPR) and artificial respiration**

- **Poisoning:**

- Action to prevent poisoning

- First aid treatment for poisoning by mouth & all other poisons

- **Vital signs:**

- Blood pressure (BP), Pulse, H.R, R.R, temperature
- IM and IV injection and test for allergy
- skills and attitudes in the field of environmental health & Nutrition
- skills and attitudes in the field of health education and Family planning and solving some of health problems affecting the community

- **Injection:**

- IM and IV injection and test for allergy

Practical Part:

Selected experiment above topics

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References**:**

- St. John Ambulance Reference Guide
Part Number 6504-11

- Emergency First Aid James Kavanagh Ra

SYLLBUS OF

SECOND SEMESTER

FIRST YEAR

Course title	**Islamic culture**
Course code	**SUR121**
Level/ Semester	**L2 /s1**
Crated hours	**2 hours**
Course Description	مقرر الثقافة الإسلامية يشمل مفهوم الثقافة لغة وإصطلاحاً وعلاقة الثقافة الإسلامية بالثقافات الأخرى ويتضمن مفهوم أركان العقيدة الإسلامية خصائص العقيدة وآثارها على الفرد والمجتمع
Objectives	1- تعريف الطالب بمفهوم الثقافة الإسلامية ومصادرها وخصائصها. ٢- توضيح مفهوم العقيدة الإسلامية وخصائصها وقضاياها، وآثارها في الفرد والمجتمع. ٣- بيان معنى العبادة في الإسلام وخصائصها ودوافعها وحكمها. ٤- التعريف بالمفاهيم والممارسات الخاطئة التي تصاحب تطبيقها
learning outcomes:	**– معرفية**: ١- فهم مصطلح الثقافة، ومعرفة مفهوم الثقافة الإسلامية وخصائصها وأهميتها وعلاقاتها بالثقافات الأخرى. ٢- فهم مصلح العقيدة الإسلامية وخصائصها وآثارها في الفرد والمجتمع، ومعرفة مجموعة من مسائل العقيدة المهمة في واقع الحياة. ٣- فهم معنى العبادة في الإسلام، وخصائصها وحكمها ودوافعها ومقاصدها مع استيعاب المفاهيم والممارسات الخاطئة في العبادة. **ب – مهارات علمية:** ١- القدرة على التعامل مع الثقافات الأخرى من منطلق التميز بثقافته مع الاستفادة من النافع من الثقافات الأخرى. ٢- القدرة على تحقيق الآثار العملية للعقيدة في ذاته وفي واقعه الاجتماعي. **ج – مهارات شخصية وتحمل المسؤولية:** القدرة على التمييز بين المفاهيم الصحيحة للمسائل الكبرى في العقيدة، والتطبيق الصحيح لها، وبين المفاهيم الخاطئة وما يترتب عليها من انحرافات سلوكية محرمة. د **- مهارات التحليل والاتصال** القدرة على تحقيق مقاصد العبادة وتجنب المفاهيم والممارسات الخاطئة فيها
Topics	- مفهوم الثقافة الإسلامية : المعنى اللغوي للثقافة، المعنى الإصطلاحي للثقافة، مفهوم الثقافة الإسلامية، علاقة الثقافة بالعلم والحضارة. ٢- مصادر الثقافة الإسلامية: القرآن الكريم، السنة النبوية، التاريخ الإسلامي، الحضارة الإسلامية، اللغة العربية وآدابها.

٣- أهمية الثقافة الإسلامية: التميز في الهوية والمقومات، العمق والارتباط التاريخي، الاعتزاز والانتماء الحضاري، القدرة على التفاعل الواقعي. ٤- علاقة الثقافة الإسلامية بالثقافات الأخرى: صور من ضعف فعالية الثقافة الإسلامية، صور من هيمنة الثقافة الغربية، موقف الثقافة الإسلامية من الثقافات الأخرى: [الرفض والمقاطعة – القبول والذوبان – التوفيق والتلفيق – التميز والاستفادة]. ٥- مفهوم وأركان العقيدة الإسلامية: تعريف العقيدة لغة، تعريف العقيدة إصطلاحاً، حقيقة العقيدة ومفهومها ومرادفاتها، أركان الإيمان. ٦- خصائص العقيدة الإسلامية: عقيدة ثابتة، عقيدة فطرية، عقيدة مبرهنة، عقيدة واضحة، عقيدة وسطية. ٧- آثار العقيدة على الفرد:[هداية العقل ، سكينة النفس ، استقامة السلوك ، تقوية الأمل ومواجهة الصعاب ،الثبات في الشدائد ، بناء المسؤولية والرقابة الذاتية ، الفوز في الآخرة]. تحقيق الأخوة الإيمانية ، التعارف الإنساني ، [٨- آثار العقيدة على لمجتمع الانضباط السلوكي والأمني ، التكامل والتعاون الاجتماعي ، العدالة في الحكم]والقضاء ٩- مسائل في العقيدة الإسلامية: العلاقة بين العقيدة الشريعة، حرية الاعتقاد في الإسلام، الكبائر وصلتها بالعقيدة، تحكم الشريعة، الاستهزاء بالدين، الولاء والبراء، الغلو في الدين، بين العقل والنقل. ١٠- مفهوم العبادة: تعريف العبادة لغة، تعريف العبادة إصطلاحاً، مفهوم العبادة الشامل وآثاره، عناصر العبادة. ١١- دوافع العبادة: دافع الشعور الفطري، دافع الرغبة والرهبة، دافع المحبة والتعظيم، دافع الشكر والعرفان، دافع الحاجة والافتقار، دافع العادة والتقليد. ١٢- حكم العبادة وشروطها: حكم العبادة، شروط العبادة: [الإخلاص لله – المتابعة للرسول صلى الله علية وسلم]. ١٣- خصائص العبادة: الربانية والتوقيف، التوازن والاعتدال، التنوع والتعدد، العموم والشمول، الاستمرار والدوام، القصد والنية، اليسر ورفع الحرج، المباشرة وعدم الوسطاء. ١٤- حكم العبادة ومقاصدها: الصلاة ، الزكاة ، الصوم، الحج ، التوكل ، الخشية ، التوبة، الذكر، الدعاء. ١٥- مفاهيم وممارسات خاطئة في العبادة: حصر مفهوم العبادة في الشعائر التعبدية، الطاعة والتعلق بغير الله، تفريغ العبادة من جوهرها، البدع في العبادات	

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 30%
٢	عرض بوربوينت	٢	اختبار نهائي ٧٠%
٣	ـــــ	٣	إجمالي ١٠٠%

المراجع:

- الثقافة الإسلامية د/حسن الاهدل، د/ عبد الحكيم
- الموسوعة الفقهية الطبية د/ محمد احمد كنعان
- قانون الجرائم والعقوبات اليمني د/ علي حسن الشرفي
- قانون مهنه الطب والصيدلة وزاره الشئون القانوني

Course title	**English & Medical Terminology**
Course code	**SUR122**
Level/ Semester	**L2/s1**
Crated hours	**2**
Course Description	**The course is designed to Provide the student with basic principles in English language including reading, writing, listening and grammar with some medical terms and to improve the student"s reading, extracting and handling the information from some short passages**
Aims of the Course	1. Provide the student with basic principles in English language including reading, writing, listening and grammar with some medical terms. 2. To improve the students for reading, extracting and handling the information from some short passages.
Intended learning outcomes of the course:	**a- KNOWLEDGE AND UNDERSTANDING:** a1- correct the mistakes in grammar in some passages. a2- Extract the information from some short passages. a3- Define some medical terms. **b-INTELLECTUAL SKILLS** b1- Use correct verbs and grammar in writing. **c-PROFESSIONAL AND PRACTICAL SKILLS** c1- Write reports and lettersuse good language and

	grammars. **d- GENERAL AND TRANSFERABLE SKILLS** d1 Interact effectively with patients, the public and health professionals. d2- Reflect on the use of communication skills in counter prescribing.
Topics	**Writing Dictation** Retranslation Comprehension Where do you work Parts of the body on the wards Sterile producers Instruments Disinfectants and Antiseptics Admissions Arranged Admission Observation of the patient The Skin Respiration the cough and sputum Vomite Faces Urine Temperature Pulse **Composition:** **Letter writing** The use of grammar in letter writing The use of simple words keeping in view. The Scientific letters Paragraph writing keeping in view, The sentences structure and writing in clearly and neatly **Translation :-** Translation of simple passages Arabic and English The necessary rules for translation The use of tense The use of verbs etc Exercises **Punctuation** :- The use of full stop, comma, semicolon etc in a sentence. Writing reports

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	1	Lectures
2	Final Exam 70%	2	PPT Slides
3	Total 100%	3	Exercises Practical
	——	٤	Group projects

References:

1. WRITING WITH A THESIS: A RHETORIC AND READER (Eighth Edition). David and Sarah Skwire. Boston, MA: Thomson and Heinle , 2001. (A satisfactory substitute would be 7th edition of the same text.)
2. REFERENCE FOR WRITERS. Lynn Quitman Troyka . Upper Saddle River, NJ: Prentice Hall, and its companion website: www.prenhall.com/troyka.
3. WRITING ABOUT LITERATURE. (Brief Tenth Edition). Edgar V. Roberts. Upper Saddle River, NJ: Prentice Hall, 1999.

Course title	**Computer2**
Course code	**SUR123**
Level/ Semester	**L1 /s2**
Crated hours	**3**
Course Description	**يهتم هذا المقرر الى تزويد الطالب ببرامج اكسل وما يحتويه من برامج ووظائف اساسية للدوال الالكترونية والتعامل مع البيانات وحمايتها كما يتعلم الطالب مهارات واساسيات البحث الالكتروني والتقنيات المستخدمة في مجال الانترنت**
Objectives	**يهدف المقرر إلى تزويد الطالب بالمعارف والمهارات التالية :** **أ. أساسيات برنامج أكسل ومكوناته البرمجية -الطرق المختلفة لإدراج الجداول الالكترونية** **ب. الوظائف الأساسية للدوال الإلكترونية ببرنامج أكسل والتعامل مع البيانات وحمايتها** **ت. التقنيات المختلفة لتصميم عروض تقديمية احترافية ببرنامج البوربوينت** **ث. المبادئ الأساسية للبحث الإلكتروني باستخدام تقنية النت** **ج. التقنيات المستخدمة في مجال الإنترنت والمراسلة الإلكترونية** **المبادئ الأساسية لإنشاء بريد إلكتروني في محركات مجانية مختلف**
learning outcomes:	**2 Learning Outcomes(knowledge &Skills. مخرجات التعليم (المعارف والمهارات) (** • **بعد الانتهاء من دراسة هذا المقرر يتوقع أن يكون الطالب قادراً على :** • **أ. التعرف على وظائف الأدوات المستخدمة ببرنامجي الجداول الحسابية** • **والعروض التقديمية** • **ب. التعرف على المعادلات الحسابية وطرق إنشاء الصيغ الحسابية المختلفة** • **ببرنامج أكسل والتعامل معها** • **ت. إتقان مهارات تصميم الجداول المنسقة والصيغ الحسابية المختلفة** • **ث. تصميم الدروس التعليمية الاحترافية والعروض التقديمية المنسقة** • **باستخدام برنامج العرض التقديمي** • **ج. التعرف على مفهوم تقنيات الإنترنت والبحث الإلكتروني** • **ح. معرفة خطوات إنشاء البريد الإلكتروني والمراسلة** • **وإتقان مهارات المراسلة الإلكترونية** • **خ. القدرة على إنشاء البريد الكتروني في مواقع إلكترونية مختلفة** • **د. القدرة على التمييز بين إيجابيات وسلبيات الإنترنت**
Topics	• **اساسيات الإنترنت وإعداد الإتصال- التعامل مع الإنترنت والبحث الإلكتروني** • **انشاء البريد الالكتروني في مواقع مختلفة - المراسلة الإلكترونية** • **التحميل من الانترنت – الأشتراك بموقع Facebook- الدردشة**

• اساسيات برنامج بورربوينت وتصميم العروض التقدميه- ادراج العناصر الى الشرائح • وتنسيق العرض -إضافة المؤثرات الفنية للعرض • أساسيات برنامج أكسل- وتصميم الجداول الحسابية- • تنسيق الخلايا والجداول الحسابية -إنشاء الصيغ الحسابية • تابع الصيغ الحسابية - والدوال وبعض أنواعها • الدوال الشرطية- • التعامل مع البيانات وحمايتها- التعامل مع أوراق المصنف • المخططات البيانية • إعداد الصفحات للطباعة- الطباعة	

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 20%
٢	عرض بوربوينت	٢	عملي40%
٣	التطبيقات العملية	٣	اختبار نهائي 40%
	ـــــ	٤	إجمالي ١٠٠%

المراجع:

- كتاب مبادئ انظمة الحاسوب – تطبيقات للمؤلف فهد الوصابي

Course title	**لغة عربية (٢)**
Course code	**MCR124**
Level/ Semester	**L1 /s2**
Crated hours	**2**
Course Description	**هذا المقرر يتناول عدة موضوعات وهي:** **المبتدأ و الخبر ، و كان و أخواتها ، و إنّ و أخواتها ، و ظن و أخواتها.**
Objectives	
learning outcomes :	**من المتوقع في نهاية هذا المقرر:** **-1 أن يدرك الطالب المبتدأ و الخبر في الأسلوب العربي.** **-2أن يعرف الطالب علة أن يكون المبتدأ معرفة.** **-3أن يفهم الطالب مسوغات الابتداء بالنكرة.** **-4أن يعي الطالب بقية أحكام المبتدأ و الخبر.** **-5أن يعرف الطالب عمل " كان " و أخواتها و إن و أخواتها و ظن و أخواتها " .** **-6أن يدرك الطالب بقية أحكام تلك النواسخ.** **-7أن يجيد الطالب استعمال تلك النواسخ مع مراعاة الأحكام الخاصة بكلٍ منها.**
Topics	**المبتدأ و الخبر** — كلمة موجزة عن مفردات المقرر ، و الكتاب المقرر ، و أهمية النحو في دراسة الطالب ، ثم نتناول تعريف المبتدأ ، و تعريف الخبر ، و أقسام كل منهما ، وعرض وافٍ من الأمثلة و الشواهد التطبيقية . **المبتدأ و الخبر** — مسوغات الابتداء بالنكرة ، و رابط الخبر الجملة ، و أحكام الخبر إذا كان جملة ، و تعدد الخبر

	لمبتدأ واحد ، و تقدّم الخبر على المبتدأ جوازًا .	
المبتدأ و الخبر **و كان و أخواتها**	تقدّم الخبر على المبتدأ وجوبًا ، و جواز حذف كلٍ من المبتدأ و الخبر ، و مواضع حذف الخبر وجوبًا ، كان و أخواتها ، عرض وافٍ من الأمثلة و الشواهد التطبيقية لـ " كان و أخواتها " إيضاحًا لعملها .	
كان و أخواتها	مراجعة شاملة على باب المبتدأ و الخبر و كان و أخواتها مع إيضاح الأحكام الخاصة في هذه الموضوعات . ما يعمل بدون شروط من هذه الأفعال ، ومايعمل منها بشروط ، و أحوال الخبر بالنظر إلى التوسط و غيره .	
إن و أخواتها	عمل هذه الحروف ، و عددها ، و معناها ، و حكم عملها إذا اتصلت بها " ما " الحرفية . تخصيص جزء من نهاية المحاضرة لمداخلة الطلاب و الإجابة عن تساؤلاتهم و استفساراتهم .	
إن و أخواتها	عمل " إنّ " المخففة من الثقيلة ، و حكم " لكنْ " المخففة من الثقيلة ، و عمل " أن " المفتوحة الهمزة و المخففة من الثقيلة ، و أحوال اسمها و خبرها .	
إنّ و أخواتها	عمل " كأن " المخففة من الثقيلة ، و أحكام اسمها و خبرها . عرض أسئلة على الطلاب و فتح باب المناقشة و إيضاح ما يشكل على الطلاب في بعض الأحكام .	
إنّ و أخواتها	مراجعة شاملة لما سبق شرحه ، و مناقشة الطلاب في الموضوعات السابقة ، حيث كلفوا بالإجابة عن أسئلة شاملة لما سبق شرحه . ثم شرح ما بقي من المحاضرة و بيان حكم توسط خبر هذه الحروف .	
إن و أخواتها	مواضع كسر همزة " إنّ " و جواز دخول اللام على خبر " إن " ، أو اسمها ، أو معمول خبرها ، أو ضمير الفصل .	
الاختبار الدوري	يراعى في الاختبار الجانب التطبيقي ، مع عمق الأسئلة ، و وضوحها ، وشمولها لكل ما سبق شرحه .	
لا النافية للجنس	نصف الوقت الأول يُراجع فيه أسئلة الاختبار ، ليتضح للطالب الإجابة الصحيحة . ثم يتم شرح	

	أحكام لا النافية للجنس .	
لا النافية للجنس	حكم العطف على اسم " لا " مع تكرار " لا " و بدون تكرار ، و نعت اسم " لآ " .	
اختبار قصير	نصف الوقت الأول بعض أحكام ظنّ و أخواتها . ثم يجرى الاختبار في وقت يناسبه .	
ظنّ و أخواتها	مراجعة أسئلة الاختبار . ثم إيضاح ما بقي من أحكام " ظنّ و أخواتها " .	
الاختبار النهائي		

الرقم	طرق التدريس	الرقم	التقييم
١	المحاضرات	١	اعمال فصل 20%
٢	عرض بوربوينت	٢	عملي40%
٣	التطبيقات العملية	٣	اختبار نهائي 40%
	ـــــ	٤	إجمالي ١٠٠%

المراجع:

المهارات اللغوية "المستوى الأول"

Course title	**Medical Physics**
Course code	**MCR125**
Level/ Semester	**L1 /s2**
Crated hours	**3**
Course Description	Introduction to Medical Physics practical introduction to key physical principles as applied to medical imaging and radiation therapy. Topics covered will Include: imaging metrics, ionizing radiation and radiation safety, radioactivity, radiation therapy, Computed tomography, nuclear medicine, ultrasound, and magnetic resonance imaging.
Objectives	• Know the scientific terms, fundamental units and basic principles of physics relatedto medicine and allied sciences. • Be aware of some apparatus and understand the techniques used in the solutionof some of the medical science problems. • Be able to understand and interpret information presented in tables, graphs and mathematical equations. • Be capable of understanding how main facts and generalizations can provide explanations of familiar phenomena in the human body. • Be able to present the results at practical work in the form of complete, understandable and objective reports.
learning outcomes :	1. To understand the physical concepts of ionizing radiation 2. To understand the interactions between ionizing radiation and biological materials 3. To understand the principles of Health Physics

	4. The interpretation of diagnostic images with an understanding of the physical limitations of the technique Have a basic knowledge of the principles of physics and medicine as they pertain to radiation therapy
Topics	**1. ATOMICPHYSICS** Traditional definition of atom, periodic system of elements, mechanical properties of atom, emission of light and its frequencies. Electromagnetic spectra. Principles of Nuclear Physics – Natural radioactivity, Decay series, type of radiation and their applications, artificially produced isotopes and its application, accelerator principles; Radionuclides used in Medicine and technology**.** **2. INTERACTION WITH LIVING CELLS** Target theory, single hit and multi target theory, cellular effects of radiation, DNA damage, depression of Macro molecular synthesis, Chromosomal damage. **3. SOMATIC EFFECT OF RADIATION** Radio sensitivity protocol of different tissues in human, LD 50/30 effect of radiation on skin, blood forming organs, lenses of eye, embryo and Endocrinal glands. **4. GENETIC EFFECT OF RADIATION** Threshold of linear dose effect, relationship, factors affecting frequency of radiation induced mutation, Gene controlled hereditary diseases, biological effect of microwave and RF wave. Variation in dielectric constant and specific conductivity of tissues. Penetration and propagation of signals effects in various vital organs, Protection standards. **5. PHOTO MEDICINE –**Synthesis of Vitamin D in early and

	late cutaneous effects, Phototherapy, Photo hemotherapy, exposure level, hazards and maximum permissible exposures. LASER PHYSICS – Characteristics of Laser radiation, Laser speckle, biological effects, laser safety management. **Practical Part:** Selected experiments on the above topics.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

Reference:

1. Introduction to Radiological Physics and Dosimetry, Frank Herb Attix, Wiley-VCH, Germany, 2004 edition. ISBN-10 = 0-471-01146-0, ISBN-13 = 978-0-471-01146-0
2. Medical Imaging Physics, by W.R. Hendee and E.R. Ritenour, ISBN 0471382264.
3. Physics of Radiology, A.B. Wolbarst, ISBN 0838557694.

Course title	**Laboratory technique**
Course code	**MLS126**
Level/ Semester	**L1/s2**
Crated hours	**3**
Course Description	Instruction and laboratory practice focus on the basic knowledge and skills required for practitioners in all areas of the clinical laboratory. Selected topics include specimen collection and handling, safety, spectrophotometry, microscopy, laboratory information systems, and introduction to ethical, professional, and legal issues,
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. Implement the laboratory policies and rules. 2. Know the different laboratory equipments and how to use them properly 3. Explain the function of the medical laboratory instruments and apparatus. 4. Use and maintain the laboratory instruments and equipments. 5. describe the methods of biological specimens collections, handling, saving and transports 6. describe the safe laboratory design 7. explain the principles of reporting and recording test results 8. Describe and maintain the laboratory instruments and equipments.

learning outcomes	**a- Knowledge and understanding:** • Describe the laboratory policies and rules. • describe the safe laboratory design • describe the methods of biological specimens collections, handling, saving and transports • explain the principles of reporting and recording test results **b- Intellectual skills:** b1- Differentiate between making Table in word and in Excel b2- Design safe laboratory **c- Professional skills:** • Use the different laboratory equipments . • Use the medical laboratory instruments and apparatus. • reporting and recording test results. • collecting, handling, saving and transports of biological specimens **d-General and transferable skills:** • Apply the laboratory policies and rules in respective fields.
Topics	**introduction to ethical, professional, and legal issues in MLS** • **Laboratory hours and emergency care** ❑ Laboratory policies, definition and its fundamentals ❑ Organization of the medical microbiology laboratory ❑ Laboratory organizations: safe laboratory design ❑ Laboratory, Responsibility and professional ethics • **Biological specimens** ❑ **COLLECTION and TRANSPORT of SPECIMENS for MICROBIOLOGICAL EXAMINATION** ❑ Packing, containers and dispatching of samples • **Equipment used in the medical microbiology laboratory** • **Laboratory glass and plastic ware:** ❑ General laboratory plastic and glass ware: (beakers, bottles flasks, funnel, pipettes, etc.) ❑ Small glassware and equipments (tube, slides, cover slides,

	Petri-dishes, spatula, forceps, holders, etc. ❑ Cleaning and care of glass ware and plastic ware • **The microscope:** ❑ Definition, types, principle, its parts - types of lances, magnification ❑ Using and maintenance of microscope • **Miscellaneous equipments:** ❑ Water bath, hot air oven, incubators, centrifuge and digital balance: principle, its parts, using and maintenance ❑ Distillation and de-ionization ❑ Spectrophotometer, flamephotometer ❑ PCR, ELISA, RIA, Biochemical analyzers. (briefly) ❑ **Practical Part:** Selected experiments on the above topics.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**	٤	Group projects
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

- District Laboratory Practice in Tropical Countries, MONIKA, ... Part 1, 2

Course Title	**ANATOMY**
Course code	**MCR127**
Level/ Semester	**L1/S2**
Crated hours	**3**
Course Description	The course is concerned with the fundamental anatomical knowledge about the integumental structures, locomotive skeleton (joints & skeletal muscle), neurons, cardio-vascular, respiratory, digestive and uro-genital systems. The practical part will be devoted to tutorials and studying on anatomical models of different body organs in each system that is mentioned above.
Objectives	Overall aims of course: To provide the students with an account of anatomical facts they need to know to act as a base to build upon when necessary, regarding anatomy of different body systems including Respiratory System, Cardiovascular System, Lymphatic System and Genital System.
learning outcomes	**1. <u>knowledge and understanding:</u>** By the end of the course, student should be able to: a1- Understand fundamentals of Anatomy a2- Understand bases of anatomy of different body systems including Respiratory System, Cardiovascular System, Lymphatic System and Genital System. **1. <u>Intellectual skills</u>** By the end of the course, student should be able to: b1- Make complete differentiation of the anatomy of body organs studied

	b2- Properly use different anatomical terminology 1. *Professional and Practical Skills* By the end of the course, student should be able to: c1- Differentiate between anatomy of body organs studied c2- Identify Common anatomical models used 1. *General and Transferable skills* By the end of the course student should have a great deal of information about fundamentals of Anatomy regarding different body systems including Respiratory System, Cardiovascular System, Lymphatic System and Genital System.
Topics	**The Human Body: An Orientation** • Cell and tissues (Cell membrane , cell organelles and epithelial, • connective, muscular tissues). • Tissues (epithelial, connective, and muscular tissues). • Skeletal system and bone structure. • Skin (Dermis, epidermis, and nails). • Lymphatic system (lymphatic vessels and lymph nodes). • Central nervous system (Brain: types of nerve cells, CSF, • cerebrum, brain stem, and cerebellum). • Central nervous system (Spinal cord and spinal nerves • , cranial nerves, and Autonomic nervous system). • Cardiovascular system (types of blood vessels and heart structure). • Respiratory system (nasal cavity, pharynx, trachea, bronchi, • and alveolar structure). • Gastro-intestinal system (mouth, esophagus, stomach, small intestine, • large intestine). Liver and Pancreas (exocrine part).

	• Endocrine system (Pituitary gland, thyroid gland, adrenal gland, • Parathyroid gland, endocrinal part of Pancreas). • Male reproductive system (testis, seminal vesicle, urethra and penis). • Female reproductive system (vulva, vagina, uterus, Fallopian tube, • and ovaries). • Renal system (Kidney and renal tubules, ureters, Bladder, • and urethra in male and females). • Eye and ear. **Final Exam Week** **(PRACTICAL)** • Study of different systems with the help of charts and models. • Microscopic studies of different types of cells & tissues. • Study of Contraceptive devices.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**	٤	Group projects
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

Essentials of Human Anatomy and Physiology, 8th Edition, 2006.

By Elaine Marieb.

SYLLBUS OF

FIRST SEMESTER-

SECOND YEAR

Course title	**Human Physiology**
Course code	**MLS211**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	This course provides the students with a broad knowledge of functions of the human body. Topics which are covered in detail include the organization, regulation and function of the muscular, gastrointestinal, respiratory, cardiovascular, renal, endocrine, nervous and reproductive systems
Objectives	1. Acquire an appropriate functional background of cells, tissues, organs& systems. 2. Integrate physiological data & mechanisms with the ongoing basic sciences: anatomy, histology& biochemistry and clinical applications. 3. Explore in detail the functions of the autonomic, the neuromuscular, the respiratory and the cardiovascular systems as well as their integration to achieve homeostasis.
learning outcomes	**a-KNOWLEDGE and UNDERSTANDING:** a1. Describe the cellular functions at the organelle and molecular level. a2. Describe & explain the function of the nerve cell the nerve & muscle fiber grossly & the molecular level. a3. Describe & explain function of the autonomic nervous system, different component of blood, the respiratory & cardiovascular system both grossly and molecular level. a4. Describe some biophysical laws & their relation to physiology.

	b-INTELLECTUAL SKILLS: b1. Interpret the most important physiological laboratory results (blood, respiratory, neuromuscular), to distinguish a physiological from pathological condition. b2. Comment, on some clinical parameters such as: ABP, ECG, nerve conduction velocity pulmonary functions for a normal individual. b3. Integrate physiology with other basic and clinical sciences. **d-GENERAL SKILLS AND ATTITUDES:** d1. Work separately or in a team to research and prepare a scientific topic. d2. Present clearly and effectively scientific topic in a tutorial, a staff meeting or the yearly scientific day. d3. Present physiological data in a graphical form.
Topics	**Blood and lymph** Composition and function of blood • Blood groups • Blood coagulation • Anemia's • White blood cells and immunity • Lymph formation and function • Lymph channels **Cardiovascular system** Heart and blood vessels:- • function of heart • Cardiac cycle (blood circulation) • Blood pressure and its regulation • ECG: methods of recording, normal record and common abnormalities. **Respiratory system** Physiology of respiration. • Control of respiration • Hypoxia, cyanosis and dyspnea • Pulmonary function tests **Digestive system**

	• Function of digestive organs. • Movements of alimentary canal • Role of enzymes in digestive process **Nervous system** •Neurons and Neurotransmitters • Synapses • Ganglion • Membrane potential • Impulse generation and conduction • Reflex arc • Function of central nervous system. • Autonomic nervous system
	Muscular system -Function of urinary organs. -Fluid & electrolytes balances. **Urinary system** • Physiology of endocrine glands o Thyroid o Pancreas o Pituitary o Adrenal glands o Gonads **Endocrine system** • Function of: Skin, Eye, Ear, Nose, and Tongue. • Physiology smell, taste, vision, hearing and pain. **Physiology of special senses** • **Female** ▪ Function of Ovaries, Fallopian tube, Uterus, Vagina, menstrual cycle, ▪ menopause. ▪ Function of Breast. • **Male :** ▪ Functions of Epidielymis, prostate glands ▪ Functions of Vas deference seminal vesicles.

- **Practical:**

(1) Basic and support material to be covered
(2) RBC count
(3) WBC count
(4) WBC differential count
ESR and Hemoglobin measurement
(5)PCV

Estimation of MCHC, MCV, MCH
(6)Bleeding count
(7) Clotting count
(8) Blood grouping
(9) Vision examination: Visual acuity
(10) Vision examination: color blindness

Examination of hearing:
(12) Examination of deafness by Tuning Fork and audiometer
(13) Examination of sensation: Pain touch pressure, vibration
(14) Examination of blood pressure
(15) Examination of temperature

Examination of pulse
Examination of autonomic nervous system
(16) Final Examination

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**	٤	Group projects
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

1. Fundamental of Physiology, a human perspective by Sherwood, third edition 2006
2. Textbook of medical physiology by Guyton and Hall, eleventh edition 2005

Course title	**Histology1**
Course code	**MCR212**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	**1- This course will provide the students with the basic knowledge of the theoretical and applied aspects of cells and tissues that form the organs of human body.** **2- This course will also cover the four basic tissues; their function, and gross as well as microscopic appearance of organs of the human body such as: nervous system, circulatory system, lymphatic system, respiratory system, digestive system, urinary system and reproductive system.**
Objectives	**This course is designed as an introductory survey of the microscopic structure of major tissues and organs of the body.** **The goal is for students to understand the major features of the structural organization of cells, tissues and organs, and how that organization is related to the function of a particular tissue** **The various topics will be presented initially in lectures and then reviewed each week.** **Students are encouraged to ask questions and to actively participate in the review sessions.** **PowerPoint slides to accompany each lecture will be posted in advance of the lecture on the course Website**
learning outcomes	**<u>A- Knowledge and understanding</u>** ***By the end of the course, students should be able to:*** **A1- Mention the basic steps in preparing specimens for light and electron microscopy.**

A 2- Define and describe the histological characteristics of normal cells

A3- Describe the structural characteristics of the four basic tissue types

A4- Describe the functional capabilities of each tissue type and relate them to the structure.

A5- Describe and compare between different blood elements and their development.

A6- Define and discuss the basic histological structure of some systems (Vascular, Lymphatics, & skin).

B-Intellectual skills

By the end of the course, students should be able to:

B1- Correlate between histological structure & function of any cell or tissue

B2- Select appropriate methods to reveal specific microscopic features of cells and tissues.

B3- Diagnose slides different from those seen during his course but of the same organs or tissues previously studied.

B4- Distinguish between normal and abnormal karyotyping

B5- Interpret a complete blood picture report

C- Professional skills

By the end of the course, students should be able to:

C1- Identify different cell organelles

C2- Identify different blood cells in blood films

C3- Identify and differentiate between different types of epithelium, connective tissue cells, connective tissue proper &bone cells

C4- Differentiate between different tissues and organs in histological slide seen under the microscope

C5- Draw and label the structures they have seen in electron photomicrographs and under light microscope during practical classes

D- General skills

By the end of the course, students should be able to:

	D1- Appreciate the importance of life long learning and show a strong commitment to it. **D2- Use the sources of biomedical information to remain current with advances in knowledge and practice**
Topics	- Introduction, Micro-techniques, and staining - Cytology: cell membrane - Cytology (cell organoids, cytoskeleton, cell inclusion) - Nucleus (DNA, chromatin, Chromosomes, Chromosomal abnormality) - Epithelium (surface epithelium, glandular epithelium, cell junctions) - Connective tissue (CT) general characters, and CT fibers - Connective tissues cells, CT proper - Cartilage; Cartilage cells, types of cartilage - Bone; bone cells, types of bone, bone healing - Muscular tissue; structure of muscle cell fibers, types of muscles (skeletal muscles, cardiac muscle, smooth muscles) **1st Mid Term Exam** - Nervous tissue; brain, spinal cord, structure and types of nerve cells, types of nerve fibers, nerve ganglion, injury and healing of nerve cells) - Blood; blood plasma, blood cells, bone marrow, hematopoiesis - Vascular system: arteries, veins, blood capillaries, blood sinusoids - Lymphatic system: immunity, lymph nodes, spleen, thymus gland - Skin - Respiratory system: nasal cavity, trachea, bronchial tree, lung **2nd Mid Term Exam** - Digestive system: oral cavity, gastro-intestinal tube, liver, pancreas - Urinary system: kidney, urinary tract. - Reproductive system: male and female reproductive organs; such as testis, ovary, uterus. **Revision** **Special senses:** **Final exam** **Practical Schedule** ١- Introduction of microscopy, micro-techniques, and staining ٢- Electron microscopic pictures for cell ultra-structure ٣- Microscopic slides for different types of surface epithelium and

	glandular epithelium. - Microscopic slides for different types of connective tissues cells, - CT proper - Microscopic slides for different types of Cartilage 5- Microscopic slides for different types of Bone - Microscopic slides for different types of muscular tissue (skeletal muscles, cardiac muscle, smooth muscles) **1st Mid Term Practical Exam** 6- Microscopic slides of Nervous tissue; brain, spinal cord, showing the types of nerve cells, nerve ganglion. 7-Microscopic slides of blood film showing different types of Blood cell. - Microscopic slides for different types of vascular system: arteries, veins, blood capillaries, blood sinusoids - Microscopic slides for different types of Lymphatic system: lymph nodes, spleen, thymus gland 8- Microscopic slides for different types of Skin - Microscopic slides for different types of Respiratory system: trachea lung **2nd Mid Term Practical Exam** 9- Microscopic slides for different types of Endocrine glands: pituitary, thyroid, parathyroid, and suprarenal glands. - Microscopic slides for different parts of Digestive system: tongue, gastro-intestinal tube, liver, pancreas - Microscopic slides for different parts of Urinary system: kidney, urinary tract 10- Microscopic slides for different parts of Reproductive system: male and female reproductive organs; such as testis, prostate, ovary, uterus.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**	٤	Group projects
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

- Color Textbook of Histology

- Concise Histology
  Book, July 2010, by Gartner
- Functional Histology
  Book, December 2009, by Kerr
- Histology
  Book, April 2009, by Mitchell
- Histology and Cell Biology: An Introduction to Pathology
  Book, January 2015, by Kierszenbaum
- Medical Cell Biology Made Memorable
  Book, February 1999, by Norman
- Netter's Essential Histology
  Book, April 2013, by Ovalle
- Netter's Histology Flash Cards Updated Edition
  Book, August 2013, by Ovalle
- Oral Anatomy, Histology and Embryology
  Book, January 2009, by Berkovitz

- Stevens & Lowe's Human Histology
  Book, September 2014, by Lowe
- Wheater's Basic Pathology: A Text, Atlas and Review of Histopathology
  Book, December 2009, by Young

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Course title	**Helminthology**
Course code	**MCR213**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	Environment and Health, Immunization and Helminthology.
Objectives	To impart advanced knowledge on Environment and Health, Immunization and important Helminth parasites of medical, veterinary and agriculture importance
learning outcomes	
Topics	-Environment and Health : Health status and health problems with reference to Nepal. -Health Planning and Management. Health programmes in Nepal including malaria, filaria, leprosy, tuberculosis, kala-azar and AIDS. Water-related diseases. Water quality-criteria and standards emphasizing microbiological aspects. Surveillance of drinking water quality. Disposal of excreta. -Bio-medical waste management. Milk Hygiene and milk-born diseases. Food hygiene and foodborne infections (bacterial, viral, protozoan and helminthic). Disasters and communicable diseases. -Emerging and re-emerging infectious diseases. Socio-economic consequences and prospects for the control and prevention of parasitic diseases with special reference to Nepal. -Ecological management and preventive measures of parasitic diseases with reference to Nepal. Influence of human activity on the parasitic fauna of animals and man. 35 hrs Immunization: Immune response to bacterial, viral, protozoans and helminthic infections. Immunizing agents. Type of vaccine. The cold chain. Community based control by vaccination. Factors influencing the success of vaccination. Current vaccine practice. Hazards of immunization.

15 hrs

Helminthology: Trematoda : Life cycle patterns in Trematoda. Biology of monogeneid. Life cycle of Gyrodactylus elegans and Polystoma integerrimum. General organization, life-cycle, pathology, laboratory diagnosis, control and prevention of diseases caused by Clonorchis sinensis, Paragonimus westermani. Characteristics of Gastrothylax species, Strigeidae, Diplostomatidae and Prohemistomidae.

12 hrs

Cestoda: Comparative study of scolices in cestodes. Life cycle pattern of cestodes. General organization, pathology, control, and prevention of diseases caused by Diphyllobothrium latum, Dipylidium caninum and Moniezia expansa.

15 hrs

Acanthocephala and Zoonoses: General organization and life-cycle of Acanthocephala.

Knowledge of nature of Helminthic zoonotic diseases: Clonorchiasis, Fasciolopsias, Echinococcosis, Taeniasis and Trichinellosis.

8 hrs

Nematoda : General organization, life cycle and economic importance of Nematodes with reference to following forms- Human : Strongyloides stercoralis, Trichuris trichura, Ancylostoma duodenale. Veterinary: Trichostrongylus orientalis, Haemonchus contortus, Thelazia callipaeda. Plant: Stem nematodes (Anguina tritici). Root-gall nematodes (Meloidogyne incognita). Cyst-nematodes (Heterodera and Globodera). Predatory (Mononchus). Migratory (Xiphinema) and Free living soil nematodes: Tylenchus, Rhabditis and Dorylaimus. Insect: Steinernama and Heterorhabditis. Role of plant parasitic nematodes in agriculture with reference to nematode diseases of potato, rice and citrus plants. Effects of agricultural practices in nematode population. Introduction to Bacteriophagus, Entomopathogenic and Predatory nematodes

	Practical Part: Selected experiments on the above topics.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

- Veterinary Helminthology, 3e Paperback

- Atlas of medical helminthology and protozoology.

Course title	**Biochemistry I**
Course code	**MCR214**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	biochemistry I, an introduction to the structure and function of biological molecules and macromolecules in living systems. This will include an examination of the structure of these molecules in detail in order to understand how their unique chemical and physical properties contribute to their biological function. The structure and function of the nucleic acids will be discussed in some detail and the association of nucleic acids with proteins will introduce these important macromolecular interactions
Objectives	□ To understand the essential topics of biochemistry including □ Micro- and macromolecules of carbohydrates, lipids, proteins, nucleotides and nucleic acids □ To describe basic principles of Molecular biology and Protein synthesis □ To understand the basic biochemistry of vitamins, and enzymes □ To be familiar with the basic biochemistry of the hemoglobin and free radicals.
learning outcomes	*By the end of the course, students should be able to:* A1- Mention definition, importance, chemical structure and classification of carbohydrates, lipids, and proteins A2- Illustrate the mode of action and kinetics of enzymes and their role in the diagnosis of diseases A3- Illustrate structure and role of vitamins as coenzymes and Point out

	diseases produced by vitamins deficiency B- **Intellectual skills** *By the end of the course, students should be able to:* B1- Interpret the general scheme to reach the correct identification of unknown carbohydrate, lipid and protein solution B2- Correlate causes, mechanisms and effect of diseases based on knowledge of carbohydrate, protein or lipid biochemistry or molecular biology B3- Correlate causes, effects of diseases dependant on knowledge of vitamin and enzyme deficiency. C- **Practical and professional skills** *By the end of the course, students should be able to:* C1- Identify laboratory reagents and instruments used in biochemistry laboratory. C2- Identify the physical and chemical properties of carbohydrates C3- Perform chemical tests to study the properties of lipids and fatty acid D- **General skills** *By the end of the course, students should be able to:* D1- Write reports and essay on the different scientific items in the field of biochemistry. D2- Report the biochemical results in printable sheets D4- Use computer and internet to extract information and knowledge
Topics	Basic Organic Chemistry: 1- Atom and its structure. 2- Types of bonds and compound formation. 3- Carbon and other common atoms of organic compounds. 4- Types of formula, Functional groups and the main organic compounds. Carbohydrates:

1- Definition.
2- Biological functions.
3- Classification.
4- Digestion and absorption

Lipids:
1- Definition.
2- Biological functions.
3- Classification.
4- Digestion and absorption

Amino acids and Proteins:
1- Definition.
2- Biological functions.
3- Classification.
4- Digestion and absorption

Vitamins:
1- Definition.
2- Classification (Water and Fat soluble vitamins).
3- Members of each class as regards chemical nature, sources, daily requirement, biological function and abnormal conditions due to deficiency or toxicity.

Hormones:
1- Definition.
2- Classification according to their chemical nature.
3- Names and physiological functions of hypothalamic, pituitary, thyroid, parathyroid, suprarenal, pancreatic and sex gland hormones..

Nucleotides and Nucleic acids:
1- Definition.
2- Classification of nitrogenous bases.
3- Biological functions of free nucleotides.
4- General structure and differences between DNA and RNA.

Practical Part:

- Introduction of biochemistry and laboratory safety
- Carbohydrates and test of Carohydrates Molish test and iodine
- Benedicts test , Fehling test , Barafods test , and Seliwanoffs test
- Osazone Formation test and Ischem of unknown Carbohydrates
- Lipids and solubility test of lipids
- Acrolein test and Saponification test of Fats.
- Protein and Color test of Protein , Biuret test , Ninhydrin test ,

	Xanthoproteic test and organic phosphates test. - Precipitation test of protein Half and full saturation with salt , Isoelectric precipitation test and precipitation by heat and acid . - Ischem of unknown carbohydrates and protein - Enzyemes and alpha amylase.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

References:

1- **Harper's Biochemistry**, 25th edition, 2000, by Murray, Granner, Mayes and Rodwell. W. B. Saunder's Company.
2- **Lippincot's Illustrated Biochemistry**, 3rd edition, 2005, by Champe, Harvey and Ferrier. Lipincott Williams and Wilkins.
3- **Biochemistry,** 1st edition, 1996, by Roskoski. W. B. Saunder's Company.
4- **Color Atlas of Biochemistry**, 1st edition, 1996, by Koolman and Rohm. Thieme Medical Publishers

Principles of biochemistry with a human focus, Garrett, Reginald H. Grisham, Charles M., 1st edition 2002, Harcourt College Publishers

BOHENSKI Modern Concepts in Biochemistry latest edition , Robert C. Bohenski, Prentice Hall, Englewood Cliffs, New Jersey.

Biochemistry Stryer, by Freeman latest edition ISBN: 0716720094

Course title	**General microbiology**
Course code	**MLS215**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	The course covers bereave identification of the microbial wards (bacteria, viruses, fungi and protozoa) , classification and morphology of microorganisms (size, shape, staining reaction and structure), physiology (reproduction, growth, nutrition, cultivation, metabolism, factors affecting growth, control of microbial growth especially in vivo i.e aspects of microbial therapy), mode of action, host parasite relationship, virulence factors, disease development and host response to microbial invasion or mechanisms of resistance. Relevant groups of microorganisms i.e. bacteria, fungi, viruses and parasites are considered**.**
Objectives	**By the end of the course, the student should be able to:** **1-** Be familiar with the microbial world and its relation to humanlives. **2-** Know the methods and equipment used to investigate the microbial world. **3-** Have a background about structure, metabolic pathways, and genetics of bacterial cells. **4-** Understand the growth requirements of bacteria and how to control their growth.
learning outcomes	• Knowledge and understanding: ***By the end of the course the student will be able to*** : Handle the microorganisms, utilize their behavior and capabilities to avoid their harm or manipulate them for human

	welfare:- - Understand physical and chemical factors which affect microorganisms, principles of chemotherapy, microbial genetics, pathogenicity and microbial disease and mechanisms of resistance. - Know the basic principles of bacterial culture techniques and general biochemical tests. - Describe the morphological features of bacteria microscopically and on culture. - Describe different laboratory diagnostic test used Explain appearance of epidemics and emerging infectious diseases, necessity of developing newer chemotherapeutics and limiting development of resistance.
Topics	**1- The Microbial World** • Introduction and brief history of Microbiology. • Microbes in our. • Classification of microorganisms 2- **Bacterial Anatomy**. • Size, shape, and arrangement of bacterial cells, Structures external to the cell wall (glcocalyx, flagella, axial filaments, and Pilli), The cell wall, Structures internal to the cell wall (cytoplasm, nuclear, area, ribosomes, inclusions, and endospores). **3- Microbial Growth** - Bacterial growth requirements. - Culture media. - Preserving bacterial cultures and growth **4- Control of Microbial Growth** - Physical methods of microbial control - Chemical methods of microbial control **5- Microbial Genetics**

- Structure and function of the genetic material.
- Mutation: change in the genetic material.
- Genetic transfer (transformation, conjugation, transduction, and recombination).

6- 6- Genetic engineering.

7- Antibacterial antibiotics and their mode of action.

Epidemiological aspects: Transmission, (sources and mode of infection),Pathogenicity, toxogenicity, invasiveness and virulence.

8- **Normal bacterial flora of human body**.

9- Food, water and milk microbiology.

BACTERIOLOGY- I-(PRACTICAL)

1- Sterilization & Disinfection techniques.

2- Staining techniques-Gram stain, Acid fast stain, Albert stain…ect

3- Microscopic examination of stained cell and living bacterial preparation.

4- Preparation and uses of different culture media and Biochemical media.

5- **Characterization of Microorganisms:** Culture transfer techniques, Isolation of discrete colonies from a mixed culture, Isolation of pure cultures from a spread-plate or streak plate preparation and Cultural and morphological characteristics of Microorganisms**.**

6- Biochemical reactions-, Urease test, Citrate test, TSI, M.R., V.P, Indole test, , bile solubility test, oxidase test, catalase and coagulase test,, citrate test and.

7- Serial dilution-agar plate procedure to quantitate a viable cells.

8- -The bacterial growth curve

9- Antibiotic sensitivity test-MIC, MBC, Agar dilution, Broth dilution, Disc diffusion etc

	Anaerobic culture methods

Methods of teaching	**Educational aid**	**evaluation**
- Lectures - Videos (animation) - Groups discussions	- Board - Data show	- Attendance; 5% - Quizzes; 5% - Midterm 10% - Final 40% - Practical 40%

Refrences:

1- Kayser**, Medical Microbiology © 2005 Thieme.**
2- Greenwood et al: ***Medical microbiology***, 2002.

3- Frances T Fischbach RN,: **A Manual of Laboratory and Diagnostic Tests** 7th edition; Lippincott Williams & Wilkins: **2003**.

4- Microbiology: An Introduction. 2003. Tortora, G. J., B. R. ,Funke and C. L. Cristine. 8th edition. The Benjamin/Cummings.
5- Medical Microbiology & Immunology. 2002. Levinson, W. and E. Jawetz. Lange Medical Books.
5) Microbiology: Essentials & Applications. 1996. McKane, L and J. Kandel. 2nd edition. McGraw Hill

Course name	**Analytical chemistry**
Course code	**MCR216**
Level/ Semester	**L2/s1**
Crated hours	**3**
Course Description	***Analytical chemistry:*** This course is an introductory to analytical chemistry assess students for understanding the theoretical and practical knowledge concerning quantitative analysis as well as how to manipulate different techniques in volumetric analysis. In addition to provide students with a broad and balanced foundation of analytical knowledge and practical skills in medical laboratories
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. Apply their analytical knowledge and skills to solve theoretical and practical problems in chemistry. 2. Education in chemistry, a range of transferable skills, of value in chemical and non-chemical employment 3. Provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas of chemistry or multi-disciplinary areas involving chemistry. 4. Ensure that students become conversant with the following main aspects of chemistry: Major aspects of analytical terminology, nomenclature, conventions and units. Ensure that students become conversant with the following main aspects of chemistry: Major aspects of analytical terminology, nomenclature, conventions and units 5. Prepare the analytical solutions, and describe the properties of and types of acids base and salts 6. Apply the skills in the safe handling of chemical materials, taking into account their physical and chemical properties, including any specific hazards associated with their use. 7. Apply the skills required for the conduct of standard analytical

	laboratory procedures involved for both organic and inorganic compounds.
learning outcomes	At the end of this module, student will be able to: 1. Have a rigorous background in those chemical principles that are of particular importance to analytical chemistry. 2. Be subjected to traditional techniques of analytical chemistry. 3. Acquire confidence in his/her ability to obtain high quality analytical data. *Communication skills* 1-Adapt group discussion technique 2-learn the student the principle of team-work 3-Show respect for the students' opinion. *Practical and subject specific skills (Transferable Skills).* • Learn how to follow general policies and safety precautions in the lab. • Learn handling of glassware in the lab. • Learn how to deal with heat sources in the lab. Learn different lab techniques as filtration, Decolorization, Drying and Reflux
Topics	• **Acid - Base titrations:** ❑ Definition ❑ Theoretical bases of neutralisation reactions ❑ Neutralisation indicators ❑ Colorimetric determination of pH ❑ Neutralisation titration curves • Application of neutralisation reaction • **Concepts of:** ❑ Molarity, normality, molality ❑ Measurements of units • Applications • **Precipitation titration** ❑ Theory preciptimetry ❑ Titration curves and end point detection

- Applications
- **Complex metric titration**
  - General considerations
  - Titration of metal with liqauds
  - Indicators
- Application
- **Solutions:**
  - Definition
  - Solvents, solute, and liquids
  - Preparations of solutions
- **Chromatography techniques:** principles, types and applications
- **Electrophoresis techniques:** principles and applications

B) Practical Part:

1- Simple acid radicals (groups I , II-III and mixtures).
2- Acid radical mixtures without interference and with interference.
3- Interfering acid radical mixtures.
4- Organic acid radicals.
5- Basic radicals (silver group, copper-arsenic group, iron group, zinc group, alkaline-earths group, alkali metal group).
6- Interference in cation analysis (oxidizing agents, organic matter, insolubles, phosphate).
7- Preciptimetric titrations:
Determination of chloride by Mohr's and Fajan's method, bromide by Volhard's method; Determination of zinc salts; Determination of chloride and iodide mixture; Determination of $HgCl_2$.
8- Complexometric titrations:
Determination of Cu^{2+}, of mixture of (Ca^{2+} and Mg^{2+}) and of Zn^{2+}
9- Gravimetric analysis:
Determination of Ca^{2+} as oxalate, and Ni^{2+} as dimethylglyoximate

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		——
١	Continuous periodic assessment 20 %		——
٢	Final examination 20%		——
	Total 100%		——

References:

Fundamentals of Analytical Chemistry, Skoog,West and Holler,
7th Ed, Saunders College Publishing, 2000 (we prefer the latest edition)

Additional Reference:

1. Bechett and Stenlake, Practical Pharmaceutical Analysis Part (I)

2. Vogels Text Book for Quantative Analysis

SYLLBUS OF

SECOND SEMESTER-

SECOND YEAR

Course title	**Pathology**
Course code	**MLS221**
Level/ Semester	**L2/s2**
Crated hours	**Lecture : 2 Hours/ week Practical class: 2 hours/week**
Course Description	This course will provide the students with the general concept of Pathophysiology. That will be discussed with appropriate reference to the general pathologic process due to cellular stress. An organized system review of the commonest diseases with adequate insight into causes, clinical manifestations, and diagnosis will be covered.
Objectives	**By the end of this course the student will be able to :** 1. To develop an understanding of the causes and mechanisms of disease and the associated alterations of structure and function. 2. To develop skills of observation, interpretation, and integration needed to analyze human disease. When provided with the anatomical lesions, and the laboratory data of a patient, to determine the most likely diagnosis and explain the pathogenesis of the disease.

learning outcomes	**A- KNOWLEDGE and UNDERSTANDING**: At the end of the course the student is expected to be able to : a1. Recognize abnormal changes in human body a2. Identify the needs of drugs. To adjust the abnormality of human. a3. Describe & explain the causes of diseases. a4. Describe & explain the symptoms of diseases. a5. Describe & explain the different between normal state & diseases state. a6. Describe some pathological poses & their relation to diseases. a7- Describe affect the drugs on diseases, **b-INTELLECTUAL SKILLS:** b1. Interpret the most important of pathology. b3. Integrate pathology and clinical sciences. b3-Relate the signs and symptoms to different diseases. **c-PRACTICAL SKILLS:** c1. Perform the indication of patient for diseases c2. Perform solve problems of diseases
TEACHING METHODS	**1. LECTURES:** The main purposes of lectures are: □ to provide up-to-date information that is not yet present in the textbooks, □ to help separate essential material from non-essential, and □ to add breadth to the course by presenting material and insights not found in the textbook, and color photographs to supplement the text. After each lecture, the lecturer will be available to answer questions. □ PowerPoint slides to accompany each lecture will be posted in advance of the lecture on the course Web Site. All students are required to regularly attend the lectures. The relatively small number of students allows for interactive type of lectures, where the students are allowed and encouraged to participate by asking and answering questions. All lectures are in Power Point format, illustrated and sometimes animated and contain explanatory diagrams. By the end of the lectures, the students are given the word format of the lectures.

	2. LABORATORIES : □ Most laboratories of the histopathology glass slide laboratories are integrated into the tutorial sessions. But there will be other laboratories in which only glass slides and photographies of organs where those slides were obtained will be shown. □ The primary purpose of the glass slides and gross pathology is not to teach you the art of morphologic diagnosis, but rather to provide a visual aid to your understanding of the mechanisms of disease. Students are required to look at the slides, and to draw the basic concepts of the morphologic changes depicted in the specimens. Some sessions may include student presentations under the supervision of a staff member. In gross pathology, students are to look at & describe pathology specimens. General comments related to the laboratory portion of MLS 352: No food or drink will be permitted at any time. This regulation will be strictly enforced by your instructor, because it exists for your safety.

Topics	**Lecture Schedule (13 weeks)** 1st Week: - Introduction, - Cell and tissue injury, heat injury, degeneration, necrosis, apoptosis 2nd Week:- Acute inflammation; causes, types 3rd Week: - Chronic inflammation; causes and types - Granulation tissue 4th Week: - Bacterial infection - Fungal infection - Parasitic infection - Viral infection 5th Week: Tissue repair 6th Week: Circulatory disorders: ischemia, congestion, gangrene, edema. **7th Week: Mid Term Exam** 8th Week: Immune disorders; hypersensitivity reactions, auto-immune diseases 9th Week: Genetic disorders 10th Week: Growth Disorders Genetic basis and tests for tumors 11th Week: Neoplasia; Causes and types of tumors 12th Week: Malignant tumors **Week (1\2\1431): Revision**

Laboratory practical Schedule (12weeks)

Week (14\10\1430): - Introduction of pathology - Microscopic slides of different types of tissue necrosis

1st Week: - Microscopic Slides and gross pathological specimens of different types of cute inflammation cases

2nd Week:- Microscopic slides and gross pathological specimens of different types of Chronic inflammatory diseases; and Granulation tissues

3rd Week): Microscopic slides and gross pathological specimens of different types of - Bacterial infection - Fungal infection - Parasitic infection - Viral infection

4th Week: Microscopic slides and gross pathological specimens of different types of tissue healing and keloid.

5th Week: Microscopic slides and gross pathological specimens of different types of ischemia, congestion, gangrene, edema.

6th Week :- Microscopic slides and gross pathological specimens of different types of hypersensitivity reactions, auto-immune diseases

7th Week : Mid Term Exam

8th Week: Microscopic slides of different types of Genetic disorders

9th Week: Microscopic slides and gross pathological specimens of different types of Growth Disorders

10th Week: Microscopic slides and gross pathological specimens of different types of Neoplasia (Lipoma, Fibroma, carcinomas, and sarcomas)

11th Week: Microscopic slides and gross pathological specimens of different types of Malignant tumors (breast, lung, GIT, kidney, muscles,….)

12th Week: Final Practical Exam

Attendance:
in tutorials and laboratories is MANDATORY. Three (3) unexcused absences leads to a failure (F) in the course. Absences must be documented in writing (e.g., doctor's note, etc.), and approved by the instructor.

Assessment:
Office and Guidance Hours Schedule
Your instructor welcomes the opportunity to assist students in any possible way. If you have questions, please contact me via e-mail, or stop by my office during the time periods listed above. Please feel free to leave a message for me on the message board. If my regular office hours are not convenient for you, please contact me to arra

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

References:

Required textbook & Study Guide:

Huether, S. E., & McCance, K. L. (2004). Understanding Pathophysiology (4th ed.) St. Louis, MO: Mosby Elsevier.

Book: Robin`s Pathology .

Course title	**Medical Protozoology**
Course code	**MLS223**
Level/ Semester	**L2/s2**
Crated hours	**3**
Course Description	This course is designed to provide students with knowledge of the biology of protozoa parasites & practice the basic skills and techniques as well as the quality control of stool examination
Objectives	By the end of this course medical laboratory science student should be able to: - Demonstrate adequate knowledge and understanding of scope medical parasitology. - Define terminology applied in medical parasitology - Demonstrate adequate knowledge and understanding of the biology of protozoa parasites and to practice relevant technology as well.
learning outcomes	By the end of this course, candidates should be able to: 1- Demonstrate adequate knowledge and understanding of the scope of medical parasitology together with the basic definitions and terminology as well as classification and nomenclature of protozoan parasites of human 2- Know the biology and taxonomy of protozoa of medical importance. 3- Practice the basic skills and techniques as well as the quality control of stool examination (direct preparation and concentration techniques used for protozoa examination)

	4- Demonstrate adequate knowledge as well as to describe and discuss the following about parasitic representatives of Phylum zoomastigophora: - Biology and morphological characteristics - Lifecycle and transmission - Clinical features - Laboratory detection and identification - Comparison between relevant species - Geographical occurrence and distribution
Topics	1- introduction to parasitology Definition of terminology 2- taxonomy of protozoa 3- Quality control of Stool examination 4- Endameba histolytica 5 -Other Entamoeba species (comparative study) 6- (Naegleria fowleri and Acanthamoeba) 7- Giardia lamblia 8- Trichomonas vaginalis 9- Other intestinal flagellates (comparative study) 10- Leishmania I: Introduction and classification Coetaneous leishmaniasis 11- Visceral leishmaniasis 12- Leishmaniasis in Yemen 13- Trypanosoma I (African Trypanosomiasis) 14- Trypanosoma II (Asian Trypanosomiasis) 15- Class test. **Practical Part** 1- Identification of Equipments used in parasitology laboratory - Principles, Uses , maintenance 2- demonstration & visual presentation of protozoan examples 3 -Stool examination 4- Detection and identification of Entamoeba histolytica 5- Detection and identification of other Entamoeba species Microscopy and visual presentation (differential morphology)

	6- Detection and identification of Acanthamoeba & Naegleria 7- Detection and identification of Giardia lamblia 8- Detection and identification of Trichomonas vaginalis 9- Detection and identification of other intestinal flagellates Microscopy and visual presentation (differential morphology) 10- Detection and identification of Leishmania species I: Coetaneous 11- Detection and identification of Leishmania species II: Visceral 12- Leishmaniasis in Sudan – visual presentation 13- Detection and identification of African trypanosomes16 14- Detection and identification of American trypanosomes Microscopy and visual presentation 15 -Class test.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

- Atlas of Medical Helminthology and Protozoology -

- Textbook of Medical Parasitology: Protozoology and Helminthology, 4 th edition by S. C. Parija

Course title	**Basic immunology**
Course code	**MLS224**
Level/ Semester	**L2/s2**
Crated hours	**3**
Course Description	This 3 credit hour course aims to introduce up to date, basic immunology concepts at a level suitable for students with little prior exposure to immunology. Course Lectures and laboratory emphasize detection, identification, nature of innate immunity, antigens and antibodies, and the antigen-antibody reaction encountered, quantities cells involved in immune responses, and quantities blood proteins produced in response to infection, malignancy or tissue damage or which play a role in protecting the body against these changes.
Objectives	By the end of this course, the medical Lab students should be able to: 1. Understand the definition and basis of immunology in order to understand the immune response to different infections. 2- Explain the body mechanisms and immune response 3- Understand the different cells, tissues and organs of immune system 4- Define antigen-antibodies 2. 5- Know the immunological techniques and serological methods used in diagnosis of infectious diseases.
learning outcomes	**Knowledge and understanding:** Immunization of animals and analysis of immune response using different techniques as precipitation, agglutination, ELISA and immunoblots. New technology in cell identification and separation. **Cognitive skills (thinking and analysis):** 1. The instructor intends utilize his skills to present the material in the textbook in an interactive way that

	stimulates the thinking side of students. Analyzing schematics and mechanisms in immunological responses in different settings will be an integral part of this course. 2. Working groups should be able to discuss their results after experiment carry out, solve and discuss problems and trouble shootings. **Communication skills (personal and academic):** 3. Students will be encouraged to communicate their ideas with the instructor at all times during and after the class. 4. To facilitate discussions and asking questions, the instructor usually starts every lecture either by asking questions or giving a quiz about the previous lecture. 5. Raising questions and discussion of results with supervisor, brain storming and group work **Practical and subject specific skills (Transferable Skills):** 6. Some areas of immunology require specific skills in the transfer process of information from the instructor to the students. This, sometimes, might require the presentation of other instruments which will be very helpful if the students are enrolled in the laboratory class accompanying the immunology lecture class.
Topics	1- General introduction to the immune system 2- Principles of innate immunity 3- Principles of adaptive immunity 4- Ag recognition in the adaptive immune system 5- Cell-mediated immune responses

6- Effector mechanisms of cell-mediated immunity

7- Antigen capture and presentation to lymphocytes

8- Humoral immune responses and effector mechanisms

9- Complement system.

10- Immune responses against infectious diseases

11- Immune responses against tumours and transplants

12- Immunological tolerance and autoimmunity

13- Congenital and acquired immunodeficiencies

14- Vaccines: Principles and practice.

15- Disorders of the immune system.

practical

- Laboratory safety, organization of immunological lab, handling of infected sera.
- Preparation of buffe rs and solutions. Complete Blood count CBC. Diffe rential blood count
- Types and princible of serological reactions
- Handling of serum and its materials
- Handling of experimental animals And blood collection
- Immunization of mice
- Direct agglutination ABO blood grouping
- Isolation of human peripheral blood mononuclear cells (PBNC) using Ficollpaque
- General ideas about:
    - Precipitation reactions, Complement fixation reaction, Neutralizationand Immunoflourescence.
    - Radioimmunoassay Application of these test in medical immunology, Serology and antisera
    - Enzyme Linked Immunoabsorbent Assay (ELISA)

Methods of teaching	Educational aid	evaluation
- Lectures - Videos (animation) - Groups discussions	- Board - Data show	- Attendance; 5% - Quizzes; 5% - Midterm 10% - Final 40% - Practical 40%

References:

1. Abul K. Abbas & Andrew H Lichtman. ***Basic immunology*****:** 2nd edition, Sauders publishers: **2004**

Daniel C, Thomas B. ***Manual of allergy and immunology: Diagnosis and therapy:*** 4th edition: Lippincott William & Wilkins Publishers; **2002.**

Course title	**Biochemistry 2**
Course code	**MCS225**
Level/ Semester	**L2/s2**
Crated hours	**3**
Course Description	This course will emphasize human biochemistry in both health and disease. The concepts are chosen to prepare the pharmacy student for learning in subsequent courses, and for understanding the medical literature. The generation of metabolic energy in higher organisms, with an emphasis on its regulation at the molecular, cellular and organ level. Chemical concepts and mechanisms of enzymatic catalysis are also emphasized. Included: selected topics in carbohydrate, lipid and nitrogen metabolisms; complex lipids and biological membranes; hormonal signal transduction.
Objectives	By completion of this course ,the students should be able to : 1.undrstand the biochemistry of the carbohydrate ,lipid and protein metabolism . 2. mention the biochemistry of minerals metabolism and body fluids 3.Understand the scientific bases of xenobiotic, oxygen free radicals and hormones . 4.Have suffient knowledge about obesity and starvation.

	5.describe the basic biochemistry of hemoglobin metabolism and biological oxidation.
learning outcomes	**a.knowledge and understanding:** 1-Define the metabolic pathways of carbohydrates, lipids, proteins, ucleotides and their micro-molecules and determine the site of each. 2. Illustrate the steps and regulatory mechanisms of these pathways. a3. Point out the related metabolic disorders and their clinical prints on biochemical and molecular basis. a4. Describe hormones, their biochemical, clinical and laboratory importance and deficiency manifestations of each. a5. Describe the components of some body fluids; viz. blood, urine, milk, Semen,CSF and sweat. A6:mention basis of biological oxidation**,** metabolism of xenobiotics ,macro and micro minerals and Hemoglobin A7: define and describe biochemical basis ofobesity and starvation **b.Intellectual skills:** b1: Interpret symptoms , signs , biochemical laboratory finding of some metabolic disorders. B2: plan ageneral scheme to reach the correct diagnosis of metabolic disturbances. B3: correlate causes , mechanisms and effects of diseases based on

knowledge of metabolism.

B4: Interpret the tests used to evaluate different endocrine glands function.

B5: Point out the clinical significance of determination of plasma evels of glucose,total proteins, albumin, cholesterol, creatinine and uric acid and someenzymes.

c.Professional skills:-

c1: Recognize tests which are important for detection of glucose in urine.

c2: Recognize tests which are important for determination of lactose in milk.

C3: Recognize tests which are important for determination of otein, creatinine , urea ,uric acid,bile acids and lipoproteins.in blood.

C4: Recognize tests for endocrinal gland functions.

C5: estimate concentration of hemoglobin in blood.

C6: estimate gastric acidity and bile concentration.

d.General skills ;

d1: write reports and essay on the different scientifc

items on colorimetric theory

d2 :report of the biochemical titration results in printable sheets

	d3 : write a full scientific reports in the field of biochemistry d4 : worke in groups and team d5 : use computer and internet to extract information and knowledge
Topics	• Introduction. • Metabolic pathways.
	• Oxidation of glucose. • Fructose and galactose metabolism. • Molecular organization and function of mitochondria. • Pyruvate oxidation and TCA cycle. • Shuttles and translocation mechanisms. • Electron transport / Oxidative phosphorylation. • Gluconeogenesis. • Glycogen metabolism. • Pentose phosphate pathway. • Metabolic energy from fatty acids. • Carbohydrate to fat pathway. • Metabolism of membrane lipids. • Lipid transport. • Clinical significances of lipoprotein metabolism. • Triglycerides & Cholesterol • Hypercholesterolemia -Atherosclerosis – Hyperlipoproteinemia. • Integration of metabolism; hormones. • Metabolism of amino acids. • Transamination. • Oxidative deamination. • The urea cycle. • Final Exam Week **Practical topics** Titration of ; 1- concentrated and diluted glucose 2- glucose in urine 3-Lactose in milk 4-Gastric juice colorimetry theory: 1-Estimation of protein in serum

	2- Estimation of creatinine 3 - Estimation of uric acid 4- Estimation of urea 5 - Estimation of hemoglobin 6- Estimation of glucose 7- Bile detection.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

Refernces:

BOHENSKI Modern Concepts in Biochemistry latest edition , Robert C. Bohenski, Prentice Hall, Englewood Cliffs, New Jersey.

Lehninger Principles of Biochemistry, Fourth Edition by David L. Nelson, Michael M. Cox Publisher: W. H. Freeman; 4th edition (April 23, 2004) ISBN: 0716743396

Principles of biochemistry with a human focus, Garrett, Reginald H. Grisham, Charles M.,1st edition 2002,Harcourt College Publishers

Principles of biochemistry, Horton. Robert, New Jersey: Prentice-Hall

Principles of biochemistry with a human focus, Garrett, Reginald H. Grisham, Charles M., 1st edition 2002, Harcourt College Publishers

BOHENSKI Modern Concepts in Biochemistry latest edition , Robert C. Bohenski, Prentice Hall, Englewood Cliffs, New Jersey.

Biochemistry Stryer, by Freeman latest edition ISBN: 0716720094

Course title	**Medical Bacteriology I**
Course code	**MLS225**
Level/ Semester	**L2/s2**
Crated hours	**3**
Course Description	This course covers systemic pathogenic, their pathogenesis, modes of transmission, epidemiology, methods for isolation and identification. Areas of study include: aerobic Gram- positive cocci, Gram- negative cocci, Gram- positive bacilli and acid fast bacilli, as well as methods of testing their susceptibility to antibacterial agents.
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. Describe the methods of specimen collection and transporter for bacteriological investigations 2. Uses the light microscopic for examination of bacterial investigates 3. Understanding the techniques used for identification of bacteria Know different biochemical tests important for identification of bacteria
learning outcomes	**Knowledge and understanding** ***By the end of this course, the medical Lab students should be able to***: 4. Describe the methods of specimen collection and transporter for bacteriological investigations 5. Uses the light microscopic for examination of bacterial investigates 6. Understanding the techniques used for identification of bacteria. 7. Know different biochemical tests important for identification of bacteria.

	(b)- Interpersonal skills and responsibility ***By the end of this course, the students will be able to:*** 1- Perform accurately different microbiological techniques for microscopic examination, staining, cultivation and identification of organisms 2- Utilize efficiently the different knowledge resources including the library resources. 3- Manipulate the laboratory results mathematically and statistically. 4- Deal ethically inside the lecture and practical classes with the staff, colleagues and environment like instruments, benches, laboratory material. **(c)- Communication Information Technology and Numerical Skills** ***By the end of the course, the students should be able to:*** 1- Perform self directed learning. 2- Collaborate with colleagues as a team work. 3- Use computers, laptops, projectors and build up power point presentation
Topics	❑ **A) Theoretical course:-** - **Introduction:** 1. Structures of the bacterial cell and the genetic makeup of bacteria (Ribosome, Plasmid, Chromosome, target of antibiotics, roles in pathogenesis or drug resistance) 2. Morphology of bacteria and the versatility of bacteria (in clinical diagnosis) 3. Bacterial appendages, bacterial spores, capsules, etc., and their related with clinic practice. 4. Techniques to study morphology of bacteria 5. Bacterial growth, survival and death, cultivation of bacteria, growth curve, bacterial metabolism, classification of bacteria.

- **Grm- positive and Gram- negative Cocci:**

1. Staphylococci (pyogenic cocci and coagulase-negative staphylococcus)

a) Morphology, culture, and biological characteristics of *Staphylococcus aureus*

b) The virulence factors of *Staphylococcus aureus* and their effects (including SPA, coagulase, hemolysin, and enterotoxin)

c) The diagnostic laboratory tests for *Staphylococcus aureus* and the principles of controlling Staphylococcus infections

2. Streptococcus (classification)

a) Morphology, culture, and biological characteristics of Streptococcus

b) The virulence factors of group A streptococcus, the pyogenic and non- pyogenic infections caused by group A streptococcus, diseases caused by group B, D streptococcus and enterococcus (streptolysin, pyrogenic exotoxin, invasive enzymes)

c) The diagnostic laboratory tests for streptococcus and pneumococcus; antistreptolysin O test (ASO test)

3. Neisseria

a) Classification of Neisseria (*Neisseria meningitides and Neisseria gonorrhoeae*)

b) The biological characteristics and pathogenicity of - and immune response to - *Neisseria meningitides*

c) Principles of diagnostic laboratory tests, and principles of prevention and treatment of the diseases caused by *Neisseria meningitides*

d) *Neisseria gonorrhoeae* and infection

- Aerobic, Gram-positive rods

e) Bacillus anthracis

f) Bacillus cereus

g) Listeria monocytogenes

h) Corynebacterium diptheriae

- Actinomycetes, norcardiosis and actinomycetoma

- Anaerobic, Gram-positive rods

1. Overview: *Clostridia* , spore forming anaerobes

a) The main biological characteristics of *Clostridia (C. tetani, C. botulinum and C. perfringens).*

b) Infection and Pathogenesis of *Clostridia* (tetanospasimin, and Botulinum toxin, toxin of *C. perfringens*) and immunity

c) Diagnostic laboratory tests for the diseases cause by *Clostridia*

d) Treatment and prevention of *Clostridia* diseases

- Mycobacterium tuberculosis

a) The main biological characteristics of M. tuberculosis

b) Pathogenesis of M. tuberculosis, Koch's phenomenon

c) Diagnosis of M. tuberculosis infection, treatment and prevention

Practical course:-

- Collection and transport of different specimens
- Preparation of media- Nutrient, blood, chocolate agar
- Operation and maintenance of autoclave, hot air oven, distillation plant
- Washing and sterilization of glasswares.
- Care and maintenance of common laboratory equipments.
- Preparation of reagents – oxidase, kovac etc.
- Aseptic practice in Lab and safety precautions.
- Simple Staining
- Gram's Staining
- Acid-fast staining
- Hanging drop technique
- Techniques of Anaerobiosi

Methods of teaching	Educational aid	evaluation
- Lectures - Seminars - Practical sessions - Group discussion	- Data Show - Videos - Labs	- Attendance; 5% - Quizzes; 5% - Midterm 10% - Final 40% - Practical 40%

References:

Kayser, Medical Microbiology © 2005 Thieme.
2- Greenwood et al: ***Medical microbiology***, 2002.

3- Frances T Fischbach RN,: **A Manual of Laboratory and Diagnostic Tests** 7th edition; Lippincott Williams & Wilkins: **2003**.

References:

Kayser, Medical Microbiology © 2005 Thieme.
2- Greenwood et al: ***Medical microbiology***, 2002.

3- Frances T Fischbach RN,: **A Manual of Laboratory and Diagnostic Tests** 7th edition; Lippincott Williams & Wilkins: **2003**.

Course title	**Hematology I**
Course code	**MLS226**
Level/ Semester	**L2/S2**
Crated hours	**3**
Course Description	***Hematology* 1:** The course provides knowledge about origin, formation, physiological and pathological basis, and function of blood cells which building on blood diseases. In addition to, the Medical Lab student will understand the basis and clinical hematology in order to gain skills in the clinical work. During the second and third years of teaching hematology the student must learn the following subjects : ➢ Hematopoiesis, Hemoglobin synthesis and disorders ➢ Red and white blood cells disorders ➢ Blood coagulation and clotting disorders ➢ Diagnostic hematology and advanced diagnosis and cares studies ➢ All above include theoretical and practical hours
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. Understand the different types of blood elements include erythrocytes, leukocytes, and platelets. Although detailed morphologic descriptions and functional characteristics of blood cells. 2. Understand the origin and development of blood cells and the pathogenesis of hematological diseases and disorder. 3. Understand the biosynthesis, function and metabolism of

	hemoglobin. 4. Understand the instruction of laboratory practice focus on routine manual procedures in hematology such as complete blood count, and differential count.
learning outcomes	2. Identify the cognitive theories of Hematology I. 3. Perform laboratory work skills. 4. Demonstrate ethical and professional behavior. **Learning Objectives** 1.1 Demonstrate safe laboratory practices at all times. 1.2 Evaluate specimen quality prior to student lab procedures. 2.1 Demonstrate the cognitive theories of Hematology I by scoring 75% or better on all lecture exams. 3.1 Following instruction, demonstration and practice sessions, operate laboratory equipment independently as demonstrated by practical exams. 3.2 Perform quality control and follow all student lab procedures and practices. 4.1 Illustrate ethical and professional behavior by adhering to attendance polices, dress codes, and general rules and regulations.. 4.2 Demonstrate respect and appropriate interpersonal skills with classmates and instructors. Cognitive With the use of course materials and various teaching methods, the student will demonstrate mastery of the following course objectives by scoring 75% or better on all examinations. 1. Characterize and differentiate all disease states involving the formed elements of blood. 2. Correlate pertinent laboratory tests and results with each disease state involving the formed elements of blood. 3. State the principles, purpose, clinical significance, sources of errors and steps of manual and automated procedures used for the quantification, identification, and differentiation of the formed elements. 4. Describe the processes of start-up, shutdown, quality

control and maintenance on automated hematology systems.
5. Describe the principles, purpose, clinical significance, sources of error and steps for sickle cell solubility tests and hemoglobin electrophoresis.

Psychomotor

Given appropriate instruction and all necessary supplies and equipment, the
student will perform the following tasks and demonstrate mastery of each task as determined by the instructor and common standards of practice. (See skills checklist for more detail)

1. Quantitate, identify, and differentiate red cells, white cells and platelets using automated procedures.
2. Perform hematology procedures such as reticulocyte count, sickle cell solubility tests, hemoglobin electrophoresis, and normal and abnormal differentials
3. Handle and operate the microscope properly.

Behavioral

Upon receiving appropriate instructions, the student will demonstrate the following attitudes and behaviors at all times as determined by mid-term and end-term evaluations. During the course of the semester, the students will:

1. attentively attend to verbal and demonstrative instruction
2. follow written and verbal instructions
3. communicate effectively in written and spoken English
4. engage in class/laboratory discussions by asking pertinent questions and responding respectfully to other student's comments
5. demonstrate a willingness to learn and apply new ideas/technical skills to future endeavors
6. demonstrate a positive teamwork ethic by being willing to assist and cooperate with others
7. develop confidence by gradually working independently in a competent manner
8. prioritize and manage work flow within a restricted time frame
9. handle themselves at all times in a professional manner and perform at the highest level of standards

	10. demonstrate honesty and integrity and abide by the Medical Code of Ethics 11. demonstrate commitment to the Medical Laboratory Technician profession **12.** be punctual to class and do not abuse break times.
Topics	**Main components of blood** • **Hematopoiesis:** ❑ Definition of blood and its formed elements ❑ Hematopoietic organs • **Erythropoiesis:** ❑ Origin, development, and control mechanism of erythroid production ❑ Nutritional requirement of erythroid series and metabolic activation of the erythrocyte and its function • **Leukopoiesis:** ❑ Origin and development of myeloid, lymphoid, and monocytes series ❑ Control mechanism of leukopoiesis production • **Thrombocytopoiesis** ❑ Origin, development and control of thrombocytes ❑ The role of thrombocytes in hemostasis ❑ Platelets, structural and functional anatomy • **Hemoglobin:** ❑ Biosynthesis, structure and function of hemoglobin ❑ Normal and abnormal types of hemoglobin ❑ Hemoglobin breakdown & clinical significant (hemoglobin pigments) ❑ Laboratory analysis of hemoglobin, and hematocrit assay (manual & automated) • *Laboratory findings in hemoglobin deficiency (hypochromic)*

- **Erythrocyte sedimentation rate (ESR):**
  - Definition, factor affecting ESR, and the clinical significant

PRACTICAL COURSE:

- **Blood collection and anticoagulants:**
  - Venous and peripheral blood collection techniques, (advantage and disadvantage)
  - Anticoagulants preparation, uses, made of action,
  - (advantage and disadvantage)
  - Plasma and serum; their constituent and functions

- **Procedures, assays, and normal values**
  - Erythrocyte count:
    - Method of counting, diluting fluid, calculation & source of errors
    - Calculation of erythrocyte parameters (MCV, MCHC,
    - MCH and their significant)
  - Reticulocyte count and its significant
  - Leukocytes count and differential
    - Method of counting, diluting fluid, calculation & source of errors
  - Thrombocyte count
    - Method of counting, diluting fluid, calculation & source of errors

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—

١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References

1. John P. Greer, John Foerster, John N. Lukens: *Wintrobe's Clinical Hematology*, 11th edition *Lippincott Williams & Wilkins, 2003*

2. Ronald Hoffman. Edward J. Benz Jr. Sanford J. Shattil: *Hoffman: Hematology*: *Basic principles and practice*; 3rd edition, *Churchill Livingstone New York 2000*

SYLLBUS OF

FIRST SEMESTER-

THIRD YEAR

Course title	**Medical Bacteriology II**
Course code	**MLS311**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	This course covers systemic pathogenic, their pathogenesis, modes of transmission, epidemiology, methods for isolation and identification. Areas of study include: Enterobacteriaceae, oxidase positive gram negative bacilli, zoonotic bacteria, Spirochetes, Haemophilus, Bordetella, Borrelia, Mycoplasma, Legenella and Chlamydiae.
Objectives	***the end of this course, the medical Lab students should be able to***: Describe the methods of specimen collection and transporter for cteriological investigations Uses the light microscopic for examination of bacterial investigates Understanding the techniques used for identification of bacteria Know different biochemical tests important for identification of bacteria
learning outcomes	***By the end of this course, the medical Lab students should be able to***: 1. Describe the methods of specimen collection and transporter for bacteriological investigations 2. Uses the light microscopic for examination of bacterial investigates 3. Understanding the techniques used for identification of bacteria. 4. Know different biochemical tests important for identification of bacteria. **(b)- Interpersonal skills and responsibility** ***By the end of this course, the students will be able to:*** 1- Perform accurately different microbiological techniques for microscopic examination, staining, cultivation and identification of organisms 2- Utilize efficiently the different knowledge resources including the library resources.

	3- Manipulate the laboratory results mathematically and statistically. 4- Deal ethically inside the lecture and practical classes with the staff, colleagues and environment like instruments, benches, laboratory material. **(c)- Communication Information Technology and Numerical Skills** ***By the end of the course, the students should be able to:*** 1- Perform self directed learning. 2- Collaborate with colleagues as a team work. 3- Use computers, laptops, projectors and build up power point presentation.
Topics	**A) Theoretical:** Morphology, pathogenicity and laboratory diagnosis of Enterobacteriaceae-I: - Escherichia coli - Klebsiella - Proteus - Shigella - Enterobacter - Citrobacter - Yersinia - Serratia - Salmonella Emerging bacterial disease Non-Enterobacteriaceae: - Pseudomonas - Vibrio Morphology, pathogenicity and laboratory diagnosis of

Gram negative bacteria:

- Haemophilus
- Bordetella
- Rickettsia

Zoonotic bacteria

- Brocella
- Basturella
- Francecella

Spirochaetes and Syphilis
Mycoplasma
Legionella
Chamydial infections:

B) Laboratory:

- Review of specimen collection and handling
- Review of staining techniques
- Automation in Microbiology
- Albert staining and Capsule staining
- Skin tests : Mantoux, Lepromin, Casoni's etc
- Isolation of bacteria (Streak, spread and pour plate)
- Methods of enriched, selective and enrichment culture techniques used to isolate organisms from clinical materials.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References:

1. Medical Microbiology. Jawetz, Melnick and Adelberg's. Latest edition.
2. Bailey and Scott’s Diagnostic Microbiology. Baron and Finegold. Latest Edition.
3. Color Atlas of diagnostic Microbiology. Maza LD, Pezzlo M, Baron E. Mosby-year book Inc., USA. Latest Edition
4. Manual of Clinical Microbiology. Murray PR, et al. ASM Press. Latest Edition.
5. Manual for the Laboratory Identification and Antimicrobial Susceptibility Testing of Bacterial Pathogens of Public Health Importance in the Developing World. Perilla MJ et al. CDC and WHO.
6. District laboratory practice in tropical countries. Monica C. Cambridge Univ. Press. Latest edition.
7. Topley and Wilson’s Microbiology and microbial infections. Balows A and Sussman M. Hodder Arnold Publication. Latest edition.

Course title	**Hematology II**
Course code	**MLS312**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	The course is designed to familiarize the students with the basics of Anaemia and advanced technical knowledge and skill used for their diagnosis. The students are also being introduced to automation in hematology and understand the basic information about WBCs disorder.
Objectives	*By the end of this course, the medical Lab students should be able to*: 1. Discussion of the physiological and pathological of blood cells and bone marrow 2. Discusses hematologic results as they relate to normal and different types of anemia and leukemia. 3. Able to diagnosis of red blood cells disorder and different types of anemia 4. Able to diagnosis of white blood cells disorder and different types of leukemia 5. Correlate between signs and symptoms of some diseases with the presence of certain hematological disorder 6. Interpretation of results

learning outcomes	Upon successful completion of this course, the student, with at least 90% accuracy of instructor obtained values, will be able to: 1. Prepare and stain an acceptable quality blood smear from whole blood. The student will be able to critically evaluate the acceptability of the smear and stain 2. Perform hemoglobin, hematocrit, red blood cell count, white blood cell counts from whole blood, given a sample of whole blood. The student will be able to correlate these values and interpret the results as normal and abnormal. 3. Calculate and interpret red blood cell indices 4. Identify normal and abnormal white blood cells and white blood cell precursors 5. Perform an erythrocyte sedimentation rate and discuss sources of error 6. Perform a reticulocyte count 7. Perform an eosinophil count 8. Perform an osmotic fragility determination and discuss its application 9. Discuss a sickle cell preparation 10. Discuss dithionite tube test (or substitute)
Topics	• Erythrocyte abnormalities (Anemia): ❑ Definition, causes and classification of anemia • MICROCYTIC ANEMIA ❑ *Iron deficiency anemia:* ❑ Metabolism of iron, iron intake (dietary), absorption, transport, & body storage ❑ Iron pathway disorders

- Iron deficiency anemia, causes, symptom
- *Laboratory findings in iron deficiency*
- *The hereditary anemias*: (hemolytic anemia):
- Classification and causes of hemolytic anemia
- Hereditary hemolytic anemias due to enzyme disorders, G6PDH and its measurements
- Hereditary spherocytosis and other anemias due to abnormalities of the red cell membrane
- Autoimmune hemolytic anemias
- *Laboratory features and diagnosis for each type*

- *Sickle cell anemia and other sickling syndromes*
- Hemoglobin S: clinical features (trait and disease)
- *Sickling test and morphologic abnormalities in sickling disorder*
- *The thalassemia*: Classification of thalassemia: *diagnosis and lab finding*
- MACROCYTIC ANEMIA:
- ***Megaloblastic anemia:***
- Definition, causes of megaloblastic anemia.
- Metabolism of vitamin B_{12} and/or folic acid vitamins
- Leukocyte disorders:
- ***Leukocytosis & leuckopenia.***
- Definitions & causes of the following:
- Neutrophilia, Neutropenia, Lymphocytosis, eosinophilia, and basophilia
- *Morphologic abnormalities in leukocytes*

- Leukemia: (briefly discuss)
  - Definitions, etiology and classification of leukemia
  - ***Acute and chronic leukemia***
  - Classification and differentiation of the acute and chronic leukemia
- *Morphologic abnormalities in acute and chronic leukemia*
- Platelets and hemostasis:
  - Normal hemostasis & congenital abnormalities
  - Vascular (Non-thrombocytopenic Purpura)
  - Thrombocytosis & thrombocytopenia, types and causes
  - Hemophilia (definition, causes, classification and symptoms)
  - **Laboratory methods for study of hemostasis and blood coagulation**
  - Platelet count, PTT, PT (INR), factor VIII assay and other factors
- *Morphologic abnormalities in platelets disorder*
- Morphologic analysis of blood cells:
  - The blood smear (staining) and its interpretation
  - Preparation of blood smears
  - Routine staining of blood smears
  - Examination of the blood smear
- *Morphologic normal and abnormalities in red blood cells, white blood cells and platelets*
- Electrophoresis and hemoglobin diagnosis- interpretation of results

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References:

1. **John P. Greer, John Foerster, John N. Lukens: *Wintrobe's Clinical Hematology*, 11th edition *Lippincott Williams & Wilkins, 2003***
2. **Ronald Hoffman. Edward J. Benz Jr. Sanford J. Shattil: *Hoffman: Hematology*: *Basic principles and practice*; 3rd edition, *Churchill Livingstone New York 2000***

Course title	**Hormones**
Course code	**MLS313**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	What are hormones, types of release, homeostasis and feedback
Objectives	The overall goal of this course is to understand the roles of vertebrate hormones. The course will cover various topics concerning the functions of these mammalian signaling proteins. The location of each endocrine organ and tissue will be studied. The site of synthesis and the actions of each hormone will be studied. In addition, the receptors for each hormone will be discussed. A number of metabolic diseases that pertain to defects in hormone production or signaling will be thoroughly covered in the course
learning outcomes	***By the end of this course, the medical Lab students should be able to:*** - Describe Hormone synthesis, secretion and transport. - Understanding Classification of hormones and chemical signalling mechanisms. - Know Hormone receptors and signal transduction processes
Topics	- Introduction (assessment of organ system function) - Endocrinology - Biochemistry , secretion and transport of hormones) - Primary , secondary and receptor site abnormalities - Physiochemical properties (steroid and amino hormones) - Hormones mechanism of action and control. - Hormones methodology I (bioassay , CPB , RIA)

8	Hormones: methodology II (IRMA, ELISA, EMIT, Fluorescent, HPLC, colorimetric, porter and pisano method)	Handout
9	Discussion.	
10	Case study	Handout
11	Component of the endocrine system-hypothalamus (oxytocin, ADH, stimulators and releasing factors)	17
12	Anterior pituitary hormones (GH, Prolactin, LH, FSH) control, action, excess, deficient and lab finding	17
13	Calcitonine, PTH (hypo, hyper and lab finding)	21
14	Adrenal gland aldosterone (control, hypo, hyper and assay)	18
15	Cortisol (function, Caushig syndrome, assay) Catecholamines (biosynthesis, function and metabolic effect on fuel metabolism and assay)	18
16	Thyroid function (biosynthesis, secretion, transport and action of thyroid hormones)	20
17	Regulation, thyroid function test, disorders and correlation with lab data	20, handout
18	Discussion.	
19	Case study.	
20	Assessment of organ function system – liver	22
21	Pancreatic function test, diseases. Assay	25
22	Gastrointestinal function test, diseases, assays.	26
23	Renal function test	24
24, 25	Specially areas of clinical chemistry – body fluid analysis (amniotic, cero spinal, sweat and synovial fluid)	27
26	Tumor markers I	30
27	Tumor markers II	30
28	Therapeutic drug monitoring (Digoxin, cyclosporine, antibiotics and salicylate)	28

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

References:

Required Textbook: 1. Bishop ML, Fody EP, & Schoeff L. (2010). *Clinical Chemistry: Techniques, Principles, Correlations* (6th ed.). Baltimore, MD: Lippincott Williams & Wilkins. ISBN: 978-0-7817-9045-1

Major References: 1. Department Procedure Manuals.

Additional Reference: 1. Burtis CA, Ashwood ER, Bruns DE. (2008). *Tietz Fundamentals of Clinical Chemistry (*6th ed.). Philadelphia, PA: W.B. Saunders.

Course title	**Blood Bank**
Course code	**MLS314**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	The subject develops skills and knowledge required for proficiency in the safe supply of human blood products. A review of antibody antigen interaction will lead into the practical application of antibody screening, identification and compatibility testing. Quality assurance and safety of the blood supply will be covered. Case study presentation will lead the student through problem solving incompatible reactions, situations they will likely encounter in a working laboratory. Advanced techniques and current developments in stem cell transplants and cord blood banking will also be discussed.
Objectives	. develop an understanding of the requirements of a safe blood supply; . Comprehend foundational knowledge of immunohematology. . become proficient in various techniques in antibody screening and identification; . become knowledgeable in techniques of compatibility testing

	and be able to problem solve incompatible reactions; . examine advanced applications; . achieve a level of proficiency required for employment in a medical laboratory.
learning outcomes	**<u>Knowledge and understanding</u>** • Define terms associated with immunohematology. • Summarize the various governing regulations that control immunohematology. • Describe documentation requirements. • Summarize requirements for quality assurance management. • Describe the normal characteristics of red cell antigens and antibodies • **<u>B-Intellectual skills</u>** • Differentiate between various antigens to include: ABO, Rh, Kell, Duffy, Kidd, Lewis, MNS, P, and Lutheran. • Describe the interaction between various antigens and antibodies. • Describe the impact of genetics and inheritance on antigens. • Factors that interfere with antigen-antibody reactions • **<u>C- Professional skills</u>** • ***By the end of the course, students should be able to:*** • Summarize considerations associated with patient pre-transfusion testing. • Discuss the importance of documentation related to pre-transfusion testing. • Distinguish between factors that affect pre-transfusion testing. • Describe quality control criteria for immunohematology to include techniques and storage. • Describe the criteria for donor selection. • Describe the procedures for donor blood typing and communicable disease identification. • Describe component preparation.

	• Identify storage temperatures and expiration dates for various components • **<u>D- General skills</u>** • Describe common patient transfusion reactions. • Describe the importance of thorough and accurate documentation. • Describe common hemolytic diseases of the newborn and associated therapies. • Describe various transfusion issues and related therapies
Topics	**Weeks Subjects** 1. Introduction to Immunohaematology 2. ABO Blood Group System 3. The Rh Blood Group System 4. Other Blood Group System 5. Antihuman Globulin (Coombs') Test 6. Detection and Identification of Antibodies 7. Cross Matching (Compatibility Testing) 8. Transfusion Reactions and Complications 9. Screening for Diseases Transmitted through Blood 10. The Blood Donor and Collection of Blood 11. Storage and Preservation of Blood and Components 12. Haemolytic Disease of the Newborn (HDN) 13. Autoimmune Haemolytic Anaemia (AIHA)

14. Blood Components

15. Transfusion Therapy

Laboratory Schedule

Week	**subject**
1-	ABO Grouping
	Rh Typing
2-	Compatibility Testing
	Investigation of Transfusion Reactions..
3-	Antiglobulin Test Antibody Identification
4-	Antibody Titration Hemolysin Test
5-	Cold Agglutinin Studies Hemolytic
	Disease of Newborn—Exchange Transfusion
6-	Reconstitution of red cells with Y-Set..
	Landsteiner Heat Eluate
7- Donor Blood Processing	
- donor selection criteria	
- Hazards of blood donation	

	Rapid Plasma Reagin Test 8- Leukocyte Poor Red Cells 9- Washed Red Cells 10- Preparation of Platelet Concentrates.... 11- Preparation of Fresh Frozen Plasma 12- Preparation of Cryoprecipitate 13- Preparation of Reagents 14- Quality Control 15- anticoagulant used in blood bank 16- blood fractionation 17- Aphaeresis 18- Blood transfusion and Stem cell transplantation 19- Blood bank policy 20- blood products 21- special transfution situation 22- Rh HDN 23- ABO HDN 24- Multiple myeloma 25- Myeloproliferative disorders 26- Case studies

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

1- Essentials of Blood Banking, A Handbook for students of Blood Banking and Clinical Residents. SR Mehdi, Jaypee Brothers Medical Publishers (P) LTD

ISBN 81-8061-642-8.

2- Textbook of Blood Banking and Transfusion Medicine.

Sally V. Rudmann

ISBN 0-7216-3453-2

3- Basic and Applied Concepts of Immunohematology, Kathy D. Blaney, Mosby 2000 ISBN 0-323-00165-3

4-Technical Manual -American Association for Blood Banks (AABB) 14th ed., ISBN 1-56395-062-9

5-Basic Medical Laboratory Techniques , 4th edition by Barbara H. Estridge, Anna P. Reynolds and Norma J. Walters,
ISBN: 0-7668-1206-5

Course title	**Medical mycology**
Course code	**MLS316**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	This course is designed to help the students knowledge about fungi and yeast to enable perform the diagnostic procedure of mycoses. Diagnosis the disease which caused by the fungus & carry out the types of specimens & necessary investigation for various diseases
Objectives	***By the end of this course, the medical Lab students should be able to***: o Recognize the pathogenic fungi and gain knowledge about human mycotic infections regarding mode of transmission, pathogenesis, and methods of laboratory diagnosis. o Acquire laboratory skills for performing standard techniques in staining and cultivating fungi. Acquire laboratory skills for identification of pathogenic fungi
learning outcomes	**(i)- Knowledge to be acquired** By the end of this course, the students will be able to: ❖ List pathogenic fungi and illustrate human mycotic infections regarding the causative fungus, mode of infection, methods of laboratory diagnosis and prevention. **(b)- Cognitive skills** **(i)- Skills to be developed** ❖ The ability to think critically, compare and analyse the studied knowledge. ❖ The ability to evaluate the causal relationship between the microbe and the disease. ❖ The ability to formulate a systematic approach for laboratory diagnosis of common infectious clinical conditions and select the most appropriate and cost-effective tool leading

	to identification of the causative organism. ❖ The ability to interpret different microbiological tests for different microbes. **(c)- Interpersonal skills and responsibility** **(i)- Skills to be developed** By the end of this course, the students will be able to: ❖ Collaborate with colleagues as a team work. ❖ Perform self directed learning. ❖ Participate in class discussion. ❖ Present a lecture to his colleagues. ❖ Deal ethically inside the lecture and practical classes with the staff, colleagues and environment like instruments, benches, laboratory material. **(d) Communication Information Technology and Numerical Skills** **(i)- Skills to be developed** By the end of the course, the students should be able to: ❖ Utilize efficiently the different knowledge resources including the library resources and websites. ❖ Use computers, laptops, projectors and build up power point presentation. ❖ Manipulate the laboratory results mathematically and statistically. **(e) Psychomotor Skills** **(i)- Skills to be developed** By the end of this course, the students will be able to: ❖ Perform accurately cultivation of fungi, ❖ Identification by slide culture.
Topics	• **Introduction of mycology:** ❑ Definition of mycology, fungi, and mycosis fungi ❑ Medical importance, classification, morphology and general characteristics of fungi ❑ Structure and growth of fungi, mould, yeast-like fungi and dimorphic fungi ❑ Reproduction of fungi - Sexual and Asexual ❑ Types of infection and immunity against fungal infections • **Types of fungi:** ❑ ***Superficial mycosis*** ❑ Definition and manifestation ❑ Common dermatophytes pathogens of man ❑ General characteriststic of Trichophyton, Microsporum and Epidermophyton ❑ Other superficial mycosis: Tinea versicolor, Tinea nigra, Black

	and white piedra, and Mycotic keratitis • Direct features and culture characteristics of dermatophytes ❑ Different ring worm infections caused by dermatophytes species ❑ ***Cutaneous mycosis.*** ❑ Definition and role of dermatologytes ❑ Location of lesions, and the disease they causes, clinical picture of dermatologytes and their transmission ❑ ***Subcutaneous mycosis:*** • Madura foot (mycetoma), chromoblastomycosis & sporotrichosis • Causative agents, general characteristics ❑ ***Systemic mycoses including:*** • Blastomycosis, coccidioidomycosis, histoplasmosis, paracoccid-oidomycosis • Candida albicans ang Gyptococcus neoformans • Actiological agents, general characteristics • **Laboratory diagnosis of fungi:** ❑ Types of specimens - Carry out skin scraping ❑ Collection, transport, processing of specimens to diagnosis of fungal infection ❑ Preparation solutions, reagents media to diagnosis of fungus ❑ Staining of fungi (lactophenol cotton blue) ❑ Direct microscopic examination of fungal spores (macroconidia, microconidia) ❑ Staining of yeasts cells (Gram's method , India ink, etc) ❑ Direct examination (macroscopic) of cultures of nonpathogenic moulds (penicillium, fusarium, mucor, rhizopus, etc) • Identification of dermatophytes: Direct examination of hair, skin and nail by KOH preparations. Cultural characteristics of the different species of the dermatophytes , staining

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

1- **Medical Microbiology**. Jawetz, Melnick and Adelberg's. Latest edition.

2. **Bailey and Scott's Diagnostic Microbiology**. Baron and Finegold. Latest Edition.
3. **Color Atlas of diagnostic Microbiology**. Maza LD, Pezzlo M, Baron E. Mosby-year book Inc., USA. Latest Edition
4. **Manual of Clinical Microbiology**. Murray PR, et al. ASM Press. Latest Edition.
5. **Manual for the Laboratory Identification and Antimicrobial Susceptibility Testing of Bacterial Pathogens of Public Health Importance in the Developing World**. Perilla MJ et al. CDC and WHO.
6. **District laboratory practice in tropical countries**. Monica C. Cambridge Univ. Press. Latest edition.
7. **Topley and Wilson's Microbiology and microbial infections**. Balows A and Sussman M. Hodder Arnold Publication. Latest edition.

Zinsser Microbiology. Wolfgang et al. Appelton & Lange Co., CA, USA. Latest edition.

Course Title : ***Epidemiology***
Code & Course No. :
Time allocated : ***Lectures*** 2 hs/week
Course designation : First semester/ Third year
Duration : 16 weeks

Course DESCRIPTION:

This course is designed to acquire student with basic concept of epidemiology & principles.

OBJECTIVES:

By the end of the course the students will be able to:-

1. Define the epidemiology.
2. Discuss the various epidemiological studies.
3. Identify the health & diseases measurement.

Intended learning outcomes of course (ILOs)

a.knowledge and understanding:

(i) Description of the knowledge to be acquired:

1. Acquire knowledge about the nature of epidemiology and its uses in health field .

2. Identify the epidemiological methods in studying causes of disease

3- Identify the importance of epidemiology in disease prevention and in a well-clinical practice .

4- Analyze the role of epidemiology in the evaluation of the effectively of health care and its competency .

8. Acquire the required skills for implementing the epidemiology basics and methods in the fields of disease prevention and health promotion.

b.Cognitive Skills:

(i) Cognitive skills to be developed:

1. Each student is expected to prepare a topic related to the course and present it for the whole class.

2 Frequent assignments during the term.

a. **Interpersonal Skills and Responsibility**:

1. Students are expected to develop certain team work activities regarding the theoretical part.

d. Communication, Information Technology and Numerical Skills

1. Encourage students to use internet for searching certain electronic journals regarding topics of the course.
2. Students are required to prepare and present subjects using different educational strategies (power point presentations, projectors,…..)

Unit	Content	Theory Hours
1.	• Introduction:- Definition and scope of epidemiology.	2
2.	• Types, Aims, and uses of epidemiology • Measuring of disease frequency	4
3.	• health and disease • Risk factors • Causality.	4
4.	• Epidemiology of communicable and non- communicable [Definitions and types of infections]	2
5.	• Epidemiological Triangle:- [Agent- Environment]	2
6.	• Epidemiological Triangle:- [susceptible and host defense]s	4
7.	• Mid term Exam	
8.	• Modes of disease transmission:- direct and indirect. • Chain of infection	4
9.	• Surveillance, control and prevention of disease	2
10	• Epidemiological investigation.	2
11	• Screening tests	2
12	• Epidemiological methods	2
13	• Epidemiological methods	2
14	• Final Exam	
Total		32

METHODS OF TEACHING:

- Lectures
- Group discussion.

Media used:

- Blackboard.
- Data show.
- Overhead projector.
- Slid projector.

Assessment of students:

- Continuous periodic assessment 30%

- Final examination 70%

REFERENCES:

- Basic epidemiology.
- Basic epidemiology by R. Beaglehole, R. Bonita and T. Kjellstrom, *WHO.*

- **مدرسي المقرر:**

م	أسماء مدرسي المقرر	التخصص	الدرجة العلمية	ملائمة التخصص لخبرات المقرر	الحاجة التدريبية لمدرسي المقرر
١					
٢					

- **منسق المقرر**

التوقيع

رئيس القسم: **د. نبيل محمد غانم قاسم**

التوقيع:

التاريخ / / ٢٠ م

SECOND SEMESTER OF THIRD YEAR

Course title	**Entomology**
Course code	**MLS321**
Level/ Semester	**L3/s2**
Crated hours	**3**
Course Description	This course offers a general introduction to insects. Topics covered include insect diversity, insect morphology and physiology, insect ecology and behavior, and considerations of the economic and medical importance of insects. By the end of this course you should be able to recognize common insects that occur in Nebraska and understand their biology and unique adaptations.
Objectives	• Insects have an enormous impact on humans. • Insects outnumber all other organisms. • Insects are amazingly diverse.
learning outcomes	***By the end of this course, the medical Lab students should be able to:*** • Understand insect adaptation and evolutionary processes. • Learn the basic external morphology of insects and how it is used in classification. • Learn the basic internal anatomy of insects, and how it is adaptive. • Describe the life cycles of important insect groups. • Understand commonly accepted phylogenetic models for arthropods • Understand how insects adapt behaviorally and ecologically. • Understand how insects affect humans medically, economically and socially
Topics	- Introduction to Urban & Structural Entomology 2- Overview of Urban Environments

	- Introduction to Arthropoda 3- Urban IPM Strategies 4 - Non-Chemical Control Strategies - Toxicology & Bioassays 5- Pesticides 6- Toxicology & Insect Resistance to Pesticides - Pesticide Application Technology & Safety 7- Population Dynamics as Related to IPM 8- Introduction to Cockroaches - Identification of Cockroaches 9-Cockroach Biology & Control 10- Introduction to Termites - Identification of Termites & Their Damage 11-Termite Biology & Control 12- Introduction to Hymenoptera -Trip to Termite Training School Site, (Riverside campus) 13- 1st MAJOR EXAM (100 pts) 14 - Ant Biology & Control -1st LABORATORY EXAM (50 pts) 15- Introduction to Bees & Wasps 16 - Introduction to Wood Destroying Beetles -spring break 17- spring break 18 - spring break -Identification of Hymenoptera 19- Coleoptera Biology & Control 20 - Introduction to Stored Product Pests - Demonstration of Fumigation Technology & Beetle ID 21- Stored Product Pests Biology & Control 22- Introduction to Diptera - Urban Pest Management As a Career & Stored Product ID -23 Fly & Mosquito Biology & Control 24 Introduction to Siphonaptera Biology & Control - Structural Pest Control Laws & Certification & Diptera ID 25 - Introduction to Fabric Pests & Their Control 26- Identification & Control of Spiders - Identification of Spiders, Fabric Pests, Lice & Bed Bugs 27- Introduction & Control of Lice & Bedbugs 28- SEMESTER PROJ. DUE (Abstracts & Printer PowerPoints) - Final EXAM. **Practical part**:

	Selected experiment on the above topics .

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

References:

- Medical Entomology
Zinabu Anamo and Negga Baraki.

- General Entomology
John R. Meyer.

- Basic Entomology by National Open University Of Nigeria
National Open University Of Nigeria

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Course title	**Hematology III (Coagulation)**
Course code	**MLS322**
Level/ Semester	**L3/s2**
Crated hours	**3**
Course Description	A discussion of normal hemostasis, hemostatic disorders, the associated clinical symptoms, and the appropriate laboratory evaluation necessary for diagnosis. Laboratory sessions help to develop skills necessary for the performance of diagnostic tests.
Objectives	In this lesson we will answer the following questions: • How do coagulation and flocculation fit into the water treatment process? • Which chemical principles influence coagulation? • Which chemicals are used in coagulation?
learning outcomes	Upon successful completion of this course the students, with at least 70% accuracy, will be able to: 1. Discuss in detail the role of coagulation factors in the process of coagulation, using proper nomenclature and relating their reactions in the intrinsic and extrinsic coagulation systems. 2. Discuss primary hemostasis, secondary hemostasis and fibrinolysis. 3. Identify abnormal results of PT & PTT, Bleeding times, FDP, d-dimer and fibrinogen. 4. Differentiate Von Willebrand's Disease from Hemophilia

	A. 5. Given PT, PTT and mixing studies identify the possible factor deficiency. 6. Discuss the platelet's role in hemostasis. 7. Discuss in detail the diseases associated with hemostatic disorders such as platelet abnormalities, vascular abnormalities, DIC, Factor Deficiencies, Von Willebrand's disease and Protein S and Protein C deficiencies. 8. Discuss the effects of Coumarin, Heparin and Aspirin on hemostasis.
Topics	1 Platelets structure and function 2 blood vessels components 3. primary and secondary hemostasis mechanism 4 Normal hemostasis & interisic and extreinsic pathway 5 coagulation factor 6 disorder of platelet function 7 bleeding disorder 8 Vascular (Non-thrombocytopenic Purpura) 9 .Thrombocytosis & thrombocytopenia, types and causes 10 .Hemophilia (definition, causes, classification and symptoms) 11 Vonwillibrand disease(definition, causes, classification and symptoms 12 Acquired coagulation disorders(vit k defiviency ,liver disease, DIC 13 Fibrolytic system 14 case study

	a. Laboratory methods for study of hemostasis and blood coagulation ***b. Bleeding time*** ***c. Cloting time*** **d. Platelet count** **e. Platelet function tests** **f. , PTT** **g. , PT (INR),** **h. factor VIII assay and other factors** • ***Morphologic abnormalities in platelets disorder***

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References:

-Practical Hematology: Sir John V. Dace & SM Lewwis, ISBN: 0 443 01981 9

2- Haematology at a Glance,: Atu Mehta & Victor Hoffbrand, ISBN 10-4051-2666-3

3- Essentials of Haematology: Shirish M Kawthalkar, ISBN 81-8061-633-9

4- Essential Haematology
Hoffbrand AV, Pettit JE, PAH Mos,4th ed. 2001, Blackwell Scientific Publications

Course title	Clinical Chemistry I
Course code	**MLS313**
Level/ Semester	**L3/s1**
Crated hours	**3**
Course Description	This course introduces the theory, practical application, technical performance and evaluation of clinical chemistry laboratory procedures. Correlation of clinical laboratory data with the diagnosis and treatment of carbohydrate, renal, liver, cardiac, lipid, protein, and pancreatic disorders, as well as acid-base and electrolyte disturbances, is emphasized
Objectives	Upon successful completion of Clinical Chemistry I, the Medical laboratory science student will: 1. Demonstrate a working knowledge of the theory and techniques utilized in standard laboratory procedures applied to Chemistry. 2. Perform manual and automated laboratory procedures with accuracy and efficiency to provide quality patient care. 3. Perform routine maintenance and basic troubleshooting techniques properly. 4. Evaluate the validity of test results by correlating interfering substances, QC results, test conditions and specimen integrity. 5. Perform calculations without error to ensure the reporting of accurate and valid test results. 6. Correlate test results with normal and abnormal physiologic conditions. 7. Demonstrate the ability to effectively communicate with the health care team, peers, patients and the public. 8. Effectively utilize clinical information systems to access and process

	patient data.
learning outcomes	Upon completion of the course the student will be able to: 1) Identify and explain various physiological and analytical causes of variability in results on patient laboratory tests. 2) Explain the biochemical consequences of disease in the major organ systems 3) Interpret the meaning of laboratory tests and assess their significance in patient disease states 4) Explain the correct use of reference intervals and identify possible factors affecting them 5) Clinically correlate laboratory values with clinical disease states. 6) Write a clinical case as seen in the concept applications throughout the course.
Topics	Clinical Chemistry Competencies Resources: 1- Identify reagents and supplies needed for each lab, organize work so that the reagents, supplies, and equipment are utilized appropriately and work is completed within a reasonable time frame. Interpersonal: 2- Recognize limitations of expertise during the performance of procedures and communicate with instructor when problems arise. 3- Maintain confidentiality of patient samples utilized. 4-Demonstrate respect for fellow students during class and lab time. 5- Utilize the Internet to interact with laboratory science students through the Blackboard communication system

	and regular email programs. 6- Information: Apply knowledge gained from lecture, laboratory and the textbook to trouble shoot and problem solve laboratory results obtained during student laboratory. 7-Utilize the Internet and other library resources to acquire information about specific topics as they relate to the field of Clinical Laboratory Science. Systems . 8- Apply critical thinking skills to clinical laboratory problems encountered, specifically, utilizing clinical laboratory principles . 9- Technology Achieve competency in routine clinical laboratory procedures utilizing a variety of reagents, supplies and techniques. 10- Utilize provided procedures to obtain appropriate information for performing and troubleshooting clinical laboratory procedures, and determining clinical significance and normal values. 11- Use computers, the Internet, and the Canvas system to access course materials and other relevant course information. **Practical Part:** - Concepts of spectrophotometric analysis • Statistics and quality control/assessment in clinical chemistry • Proteins/Enzymes • Carbohydrates • Electrolytes/Blood gases • NPN and Renal Function • Immunochemical (Ligand) assays • Lipids/Lipid profiles

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

1- Ravel R: ***Clinical Laboratory Medicine: Clinical Applications of Laboratory Data;*** 6th ed; **Mosby 1995**

2- Burits CA, and Ashwood ER: ***Titez Text Book of Clinical Chemistry*****; 3**rd ed **Saunders Co, N.Y., 2002**

Course title	**Body fluids**
Course code	**MLS324**
Level/ Semester	**L3/s2**
Crated hours	**3**
Course Description	This course provides the students with a broad knowledge about body fluid. The course includes study of normal and abnormal body fluid, their different types, formation, composition, microscopic characteristics, locations, distribution and functions in the human body and of the different organ system and their respective roles and function in the organization of the body
Objectives	The anatomy and physiology of the urinary system and the normal and abnormal composition of urine will be reviewed and expanded. In addition, the normal and abnormal composition of cerebrospinal, synovial, pericardial, plural, seminal, and peritoneal fluids fluid will be reviewed. Laboratory testing of body fluids for normal and abnormal constituents, sources of error, and clinical correlation with various disease states will be presented.
learning outcomes	**Upon successful completion students should be able to:** 1. Use an understanding of the normal and abnormal constituents of body fluids and their correlation with appropriate pathologic conditions to make appropriate and effective on-the-job professional decisions. 2. Apply appropriate laboratory techniques, methodologies, instruments and equipment; and accurately calculate, record, and tabulate data to improve patient care. 3. Adapt laboratory techniques and procedures in a corrective manner when errors and discrepancies in results are obtained to affect resolution in a professional and timely manner.

Topics	• **Urine:** Urine formation and composition of urine, ❑ ***Normal composition of urine,*** • ***Organic components -*** Urea, uric acid, creatine, creatinine, amino acids, hippuric acid • ***Inorganic components -*** Cations – Na^+, K+, Ca^+, Mg^+ and NH_4^+- Anions- Cl^-, SO_4^-, and HPO_4^- ❑ ***Abnormal composition of urine*** ❑ Describe the definition, causes and clinical applications of the following: • Protein (proteinuria), Sugar (glucosuria), ketone bodies, acetone (ketouria), bile acids, bilirubin, urobilinogen, and nitrite ❑ Renal stones: formation, composition and analysis ❑ Routine examination of urine ❑ ***Physical examination (normal & abnormal)*** • Urine volume, color, pH, appearance, specific gravity and odor ❑ ***Chemical examination*** • Urine albumin, Bence-jones protein, glucose, acetone, bilirubin, urobilinogen and nitrite ❑ ***Microscopic examination*** • White & red blood cells, epithelial cells, casts, crystals (different types), normal and pathogenesis ❑ ***Urinalysis report*** • Interpretation of the results for routine urinalysis • **Cerebrospinal fluids (CSF):** ❑ Overview of CSF - Sampling, lumber puncture

- Description, function & normal composition of CSF
- CSF color and appearance (normal & abnormal)
- ***Microscopic examination*:** total cell count, RBCs and WBCs and differential cell count
- ***Biochemical components***: glucose, LDH, protein and serological tests

- Effects of different meningitis on biochemical components of CSF
- Normal CSF reference rang and differences from child hood and adult value

- **Ascetic, pleural and peritoneal:**

- Description: exudates and transudate effusions
- Normal and abnormal composition
- ***Physical and biochemical studies*:** protein content, glucose, amylase and LDH level
- ***Microscopically examination*:** cell content and differential

- **Seminal fluids:**

- Definition, formation of semen, hormonal effects on semen formation
- Sample collection, analysis of semen – physical, microscopical and chemical examination (fructosamine)
- **Practical part:-**
  - Physical examination of urine
  - Methods of determination of specific gravity.
  - Chemical examination of urine
  - Proteinurria and determination of Bance – jones protein

	- Bile pigments and detection of bilirubin - Ketone bodies - - Microscopic examination of urine - Microscopic examination of urine - Microscopic examination of urine - Semen analysis - Semen analysis - Cerebrospinal fluid - Cerebrospinal fluid - Pleural effusion and peritoneal and synovial fluid

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

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References:

- Body Fluids Morphology Bench Guide
- Detroit Speed, Inc. - 1967-1969 F-Body - Fluid

Course title	**Medical virology**
Course code	**MLS325**
Level/ Semester	**L3/s2**
Crated hours	**3**
Course Description	• ***Virology*:** This course is designed to help the • student's knowledge about the types, structure classification, and medical significance of viruses.
Objectives	***By the end of this course, the medical Lab students should be able to***: 1. To know the definition and basis classification of viruses 2. To understand the medical significance of viruses 3. To know the different methods for laboratory diagnosis of viruses 4. Carry out rapid serological test to detect antigens and titer of viral antibodies
learning outcomes	➢ **a. b. Intellectual Skills(thinking)** ○ Student will learn the essential concepts of virology which include the structure of different viruses, properties, replication, types of infection, how viruses cause disease, immune response to infection, treatment and the inhibitory action of the antiviral chemotherapy and laboratory diagnosis. ➢ **b. Intellectual Skills(analysis)** **b1** Critically assess laboratory results. **b2** Understand the principle and operation of relevant laboratory equipment **b3** Able to correlate between different diseases and viruses associated with them to reach to final diagnosis.

	b4 Able to select the suitable sample and the suitable laboratory test for diagnosis **b5** Able to choose the required measurements for prevention and control of viral diseases. ➢ **c. Professional and Practical Skills:** **c.1** Work safely in a medical laboratory. **c.2** Be able to access relevant literature and review information. **c.3** Ability to understand different methods of laboratory diagnosis. **c.4** Practice different methods used for isolation of viruses and their identification. **c.5** Perform some serological tests used for detection of viral antigens in clinical samples and analyze the results. **c.6** Practice molecular techniques used for virus detection. ➢ **d. General and Transferable Skills:** **d.1.** The ability to use simple word and IT skills (i.e., data processing, software, internet, and multimedia) and the library to find information. **d.2.** The ability to be self-motivated learners and responsive to feedback. **d.3.** Working in team (i.e., sharing presentations and discussions and solving problem). **d.4.** Enhancement of research capability through working in independent projects. **d.5.** Reporting of the facts using printable sheets in the field of anima virology. **d.6.** Ability to write a full scientific reports in the field of animal virology.
Topics	**1)** Introduction to virology **(2)** General properties and classification of viruses **(3)** General features of viral replication and genetics **(4)** How viruses cause disease

(5) Viruses and cancer

(6) First Exam

(7) Resistant to infection

(8) The laboratory diagnosis of viral infections

(9) Safety precautions

(10) Hepatitis viruses

(11) Second examination

(12) Retroviruses and AIDS Orthomyxovirues and influenza

(13) The herpes viruses

(14) Prion diseases

(15) Antiviral chemotherapy and Control of viral disease by immunization

(16) Final Examination

Laboratory Contents:

1. Safety Orientation
2. Diagnosis of viral diseases
3. Collection, preservation and transport of virus containing specimens
4. Uses of Embryonated chicken eggs in virus isolation
5. Tissue culture and its use in virus isolation
6. virus isolation in Laboratory animal
7. Virus quantitation
8. Techniques for identifying virus isolates
9. Detection of viruses by electron microscopy.
10. Direct detection of viral antigens using serological tests.
11. Detection of antiviral antibodies using serological tests.
12. Molecular detection of viral nucleic acid.

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

GJ Tortora, BR Funke, CL Case, 2010, Microbiology, an introduction. Ninth edition by. Pearson Education, Inc.
- RA Harvey, PL Champe, BD Fisher L, 2007, Lippincot's Illustrated Reviews: Microbiology. 2nd Edition by. ippincott's Williams and Wilkins

Recommended Books

- IS ButeL SA Morse, 2004, Medical Microbiology. Twentythird edition by .IF Brooks LANGE Medical Books

Course title	**Food and Water microbiology**
Course code	**MLS326**
Level/ Semester	**L3/s2**
Crated hours	**3**
Course Description	Principles of food virology and immunology; biology, pathogenesis, immunity, and prevention of foodborne viruses; food as immuno-regulator in cancer immunology and immunodeficiency diseases; food allergy; and vaccines against foodborne pathogens.
Objectives	
learning outcomes	**Upon completion of this course, students should be able to:** 1. Summarize the basic concepts in food virology and immunology. 2. Explain the pathogenesis and immunopathology of foodborne viral pathogens. 3. Describe the host responses to foodborne viral infection. 4. Explain the function and mechanism of the immune system in the clearance of infectious pathogens. 5. Explain the immunobiology of food related allergies, tolerances, and hypersensitivities. 6. Identify the role of foods in regulating host immune response, cancer immunology, and immunodeficiency diseases. 7. List steps to develop vaccines to combat foodborne pathogens.

Topics	Introduction. History of Food Microbiology. Sampling and Determination of Microorganisms in Food. - Classification of Food-Associated Microorganisms. Factors Affecting Microbial Growth. - Microorganisms Involved in Fermentation: Dairy. - Microorganisms Involved in Fermentation: Meat and Vegetables. - Probiotics: Health-Promoting Microorganisms. - Food Spoilage Microorganisms. - Introduction into Foodborne Pathogens. Gram-Positive and Gram-Negative Organisms, Infections, Toxins and Non-Living Forms - Foodborne illness: Infections - Salmonella, Shigella and Campylobacter. - Foodborne illness: Infections - Escherichia coli and Listeria monocytogenes. - Foodborne illness: Infections Caused by Non-Living Forms - Viruses and Prions. - Foodborne illness: Intoxications - Staphylococcus aureus, Clostridium botulinum, Bacillus cereus. - Foodborne illness: Intoxications - Molds and Mycotoxins and Seafood Toxins. - Emerging Foodborne Pathogens and Topics of Current Interest. - Control of Microorganisms in Food - Physical Removal and Sanitation. - Control of Microorganisms in Food - High and Low Temperature. Death Kinetics. - Low Water Activity and Preservation by Drying. - Physical Methods of Food Preservation: Radiation, High Pressure, Pulsed Electric Field, Light and Modified Atmosphere - Chemical Preservatives. -Food Preservatives of Natural Origin – Bacteriocins and Bacteriophages. - Bacterial Stress Response Factors as a Hurdle for Food

	- Hurdle Technology as Innovative Approach in Food Preservation. - Genetically-Modified Foods - Reality and Concerns. **Practical part** Selected experiment on above topics

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		—
١	Continuous periodic assessment 20 %		—
٢	Final examination 20%		—
	Total 100%		—

References:

- Food microbiology laboratory

- Bergey's Manual of Systematic Bacteriology Volume 1

- Alcamo's Fundamentals of Microbiology

FIRSY SEMESTER

OF

FOURTH YEAR

Course title	**Diagnostic parasitology**
Course code	**MLS411**
Level/ Semester	**L4/S1**
Crated hours	**3**
Course Description	The course aims to create awareness of the major parasitic diseases in the Eastern Africa region, their epidemiology, impacts and control mechanisms. It reviews the taxonomy of major parasite groups and diagnosis of endo-parasites and / or ecto-parasites of blood and tissue, alimentary canal, uro-genital system, integument, eyes, and **skeletal** system
Objectives	to introduce general Parasitology and to impart advanced knowledge on various important protozoan parasites including some important microbial parasites and insects of medical, veterinary and agricultural importance.
learning outcomes	By the end of the course, the student should be able to: Describe the occurrence of parasites, their vectors and hosts in various geographical regions. Outline the pathological changes related to parasitic infections. Recognize, describe and sketch the important features of the parasites present in clinical specimen routinely used for diagnosis. Demonstrate mastery in the procedures and protocol for collecting,

	processing, transporting and identifying parasites from specimens, hosts and vectors Carry out simple experimental transmission and cultivation of parasites in vivo and in vitro, and drug responses Explain the importance of molecular parasitology and immunology. Articulate the importance and outline the procedure of micrometry in microscopic identification of parasites
Topics	1- General Parasitology: Scope and historical landmarks in Parasitology. Basic principles and nomenclature aspects of parasites. Parasitology as an academic and applied science. Parasite fauna of hosts belonging to different groups. Zoogeography of parasites. Host parasite inter-relationship. 2-Properties of parasites. Host specificity. Kinds of parasites. Hyper parasitism. Parasitoids. Relation of parasite fauna with the food, age and migration of the host and season of the year. 3-Molecular Parasitology: Virus: Introduction and molecular characteristics, mode of transmission, clinical presentation and control measures of human viral diseases (Hepatitis A, B & C, Dengue, 4-Mumps, Influenza and HIV). General introduction to bird flu (avian influenza). Bacteria: General characteristics, culture characters, pathogenesis, laboratory diagnosis and control measures of human bacterial diseases (Meningitis, Tuberculosis, Typhoid and Leprosy). Bacteriology of water, milk and air. Biological warfare: Bioterrorism. Fungi: Opportunistic mycoses: define and list; Candidiasis (Candida albicans). Biochemical and molecular techniques and their application: Concept of centrifugation, spectrophotometry, electrophoresis, chromatography, Westernblotting, Southern and 5-Northern blotting, ELISA, PCR and RFLP. 6-Protozoology: Amoebae : Entamoeba histolytica, Naegleria fowleri,

	Acanthamoeba. Flagellates: 7-Giardia lamblia, Trichomonas vaginalis, Trypanosoma, Leishmania. Sporozoans: Plasmodium, Toxoplasma gondii, Cryptosporidium parvum, Cyclospora cayetanensis. Veterinary importance protozoans: Trypanosoma evansi, Eimeria, Isospora, and Babesia bigemina. Biology of above medical and veterinary importance protozoan parasites. -Parasitic Zoonoses: Introduction, nature and epidemiology of zoonotic viral diseases (Rabies, Japanese encephalitis), Bacterial diseases (Brucellosis, Plague) and Protozoan diseases (Toxoplasmosis, Trypanosomiasis, Leishmaniasis and Babesiosis - Entomology: Structure, feeding habit and effect of bites of arthropod vectors. Method of pathogen transmission, causal organisms, remedies and prevention with reference to following forms: Hemiptera and Heteroptera (bed-bug), Anoplura and Mallophaga (lice), Siphonoptera (fleas), Diptera (mosquitoes), blood-sucking and disease carrying flies, Ticks: Dermacenter (cow tick) and mites (Sarcoptis scabiei), fly maggots and myiasis. Control of vector and vector-born diseases (chemical, biological, environmental, genetical and integrated). Insects causing vesication, urtication . Practical part Selected experiment on above topics

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References:

- Basic Laboratory Methods in Medical Parasitology
World Health Organization.
- Medical Parasitology by Ethiopia Public Health Training Initiative
Dawit Assafa, Ephrem Kibru, S. Nagesh, Solomon Gebreselassie, Fetene Deribe, Jemal Ali.
- Clinical Parasitology
J. D. MacLean

Course title	**Diagnostic Hematology**
Course code	**MLS412**
Level/ Semester	**L4/S1**
Crated hours	**3**
Course Description	The course is designed so as to introduce students to the basic concepts and techniques in the hematology laboratory. This entails the systematic coverage of functions, disorders and tests of red cells, hemoglobin, platelets, white cells, and coagulation systems. Haematopoiesis, erythrocyte disorders, acute and chronic leukaemias, myeloproliferative and lymphoproliferative disorders, nonmalignant leukocyte disorders, platelet disorders and coagulation disorders are all discussed. The practical work in the course is designed to expand and reinforce the ideas introduced in the lectures. Enough background and instructions on laboratory methods and instrumentation are provided to enable satisfactory laboratory performance. Automation is also stressed on with special emphasis on the various automated processes used in Haematology, ranging from the simple analyzers to the more complex electronic analyzers used in the department.
Objectives	Upon successful completion of this module the student should be able to: 1. Demonstrate an understanding of the role and the main disciplines of Biomedical Science in the day to day operation of a Haematology laboratory. 2. Demonstrate knowledge of the development and diagnosis of various diseases studied in this module. 3. Explain the principles of Quality Assurance and good laboratory practice. 4. Describe the principles of some of the most frequently used laboratory

	tests and their diagnostic significance. 5. Conduct a biomedical laboratory procedure and process, interpret and document the data obtained.
learning outcomes	**Upon successful completion of this module the student should be able to:** 1. Demonstrate an understanding of the role and the main disciplines of Biomedical Science in the day to day operation of a Haematology laboratory. 2. Demonstrate knowledge of the development and diagnosis of various diseases studied in this module. 3. Explain the principles of Quality Assurance and good laboratory practice. 4. Describe the principles of some of the most frequently used laboratory tests and their diagnostic significance. 5. Conduct a biomedical laboratory procedure and process, interpret and document the data obtained.
Topics **Principles of blood disease investigation** **Assessment of Erythropoiesis**	- Effective &non effective Erythropoiesis - Blood film - Red blood cell indices - Hemoglobin and Anemia - B.M Examination - IRON profile - AUTOMATED AND MANUAL - ANALYSERS - ELECTROPHORESIS - GENETIC BLOOD DISEASES IDENTIFICATON BY H.PL.C - REPORTING AND DATA INTERPRETATION. **Practical part :** Selected experiment on above topics

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		**—**
١	Continuous periodic assessment 20 %		**—**
٢	Final examination 20%		**—**
	Total 100%		**—**

References:

Practical Hematology: Sir John V. Dace & SM Lewwis, ISBN: 0 443 01981 9

2- Haematology at a Glance,: Atu Mehta & Victor Hoffbrand, ISBN 10-4051-2666-3

3- Essentials of Haematology: Shirish M Kawthalkar, ISBN 81-8061-633-9

4- Essential Haematology
Hoffbrand AV, Pettit JE, PAH Mos,4th ed. 2001, Blackwell Scientific Publications
ISBN 0632051531

Course title	**Diagnostic microbiology**
Course code	**MLS413**
Level/ Semester	**L4/s1**
Crated hours	**3**
Course Description	• **Diagnostic microbiology:** This course is mainly practical. It deals with the laboratory diagnosis of infections of several human anatomical sites and /or fluids.
Objectives	dentify the species of pathogenic bacteria and fungi 2. Determine the modes of transmission of infectious diseases and pathogenesis 3. Know of the theoretical foundations for the differentiation of the major pathogenic groups 4. Diagnosis of Gram-negative bacteria of the family Enterobacteriaceae, Pseudomonas 5. Diagnosis of Gram-positive bacteria from the family Staphylococcus and Streptococcus 6. Diagnosis of Gram-negative bacteria: Neisseriae, Mycobacteria, Anaerobs 7. Methods for diagnosis of different types of uncommon pathogens 8. The use of biochemical and serological tests in the diagnosis of the above-mentioned types of bacteria 9. Determine the antimicrobials to be used in the sensitivity testing of different types of pathogens.
learning outcomes	At the end of the course, students shall be able to: 1. Describe the aetiologies, epidemiology and basic mechanisms

	of pathogenesis of infectious diseases. 2. Describe the basic principles of diagnosis, antimicrobial treatment, prevention and control of infectious diseases in the hospital and community. 3. Describe the host immune system and explain the host response to infection 4. Understand and interpret basic laboratory tests for the diagnosis of infectious diseases. 5. Apply the principles of molecular and immunological techniques for the diagnosis of infectious diseases. 6. Analyze and solve case studies involving bacterial and fungal agents
Topics	• **Infections of the human anatomical sites and / or fluids** ❑ **Types of microorganism infected the following organs (study, sampling, isolation, staining and identification):** ❑ Urinary tract infections ❑ Urine, Uro-genital, urethral discharge ❑ Genital tract infections and sexually transmitted disease ❑ Lower and upper respiratory tract infections ❑ Per-nasal , anterior and nasopharyngeal swabs ❑ Sputum for microbiological investigation ❑ Throat and mouth swabs ❑ Gastrointestinal tract infections ❑ Stool ❑ Ear and eye infections ❑ Blood, bone marrow ❑ Pus from wounds, abscesses & burns ❑ Cerebrospinal fluid ❑ Serous fluids, effusions/body fluids ❑ Skin • **Laboratory (for the above organ systems)** ❑ **Specimens:** ❑ Types, selection, number of sample ❑ Collection: materials, aseptic conditions during ❑ collection, volume, ect.., ❑ Transport media, preservation time and ❑ temperature (prior to Laboratory investigation) ❑ **Processing:** ❑ Macroscopic (visual) examination for color, ❑ consistency, odor, etc.., ❑ Microscopic examination of smears ❑ stained with the appropriate staining methods

	❑ Other procedures: cell count, centrifugation, ❑ use of other Specific stains, etc ❑ **Culture:** ❑ Types of plates (including selective media when required) ❑ Incubation conditions and identification of ❑ culture isolates (biochemical, serological, etc) ❑ ❑ **Interpretation of culture results** ❑ Antibiotics susceptibility determination • Types of antibiotics sensitivity testing plates • Choice of antibiotics according to the culture • isolates and site of infection • Other methods (tissue culture serology, etc) used in • the detection of non -cultivable pathogens on • routine culture media ❑ **Reporting and results:** ❑ Design of microbiology reports and interpretation of ❑ results for each samples

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

- Bailey & Scott's Diagnostic Microbiology, 13e (Diagnostic Microbiology (Bailey & Scott's).

- TEXTBOOK OF DIAGNOSTIC MICROBIOLOGY 4TH EDITION.

- Monica part 2

Course title	**Research methodology**
Course code	**MCS414**
Level/ Semester	**L4/s1**
Crated hours	**2**
Course Description	This course focuses on the framework of the research process and to the use of basic statistics in the health field and the interpretation of results for improvement of levels of care an evaluation of action taken.
Objectives	At the end of the course the student will be able to: a. Utilize the steps of the research process. b. Recognize the importance of statistical analysis in their field of work c. Utilize descriptive statistics to analyze data from Medical Science project.
learning outcomes	**Knowledge and understanding** - Develop awareness on the importance of research in building nursing knowledge and guiding practice. - Discuss the research process and each of its steps. - Describe the characteristics of a researchable problem. - Recognize how to state research aim, questions and hypotheses. - Recognize the different types of research design. - Identify different methods of data collection. - Recognize sampling technique. **Cognitive skills (thinking and analysis).**

	- Explain how to write review of literature - Identify the elements of research proposal. **Communication skills (personal and academic).** - Conceptualize ethics of conducting nursing research. **Practical and subject specific skills (Transferable Skills).**
Topics	***Introduction:*** - Definition of scientific research - Types of research ***Research Methodology:*** -Definition and identification of the problem. - Ethical issues in research - Formulation of the hypothesis - Sample & Sampling - Collection of information - Presentation of the results - Interpretation of the results - Conclusion and recommendations ***Research Methods:*** - Scientific observation. - Questionnaire. - Interview. ***Writing the thesis report:*** Title Acknowledgement Table of content Summary Introduction Aim of the study Material and Methods Results and Discussion Conclusion Recommendations Appendices References

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	**1**	Lectures
2	Final Exam 70%	**2**	PPT Slides
3	Total 100%	**3**	Exercises Practical

References:

- Fundamental of Research Methodology and Statistics - ...

- Research-Methods-in-Education-sixth-edition

Course title	**Ethics**
Course code	**MLS415**
Level/ Semester	**L4/s1**
Crated hours	**2**
Course Description	This course will explore the various means that an intruder has available to gain access to computer resources. We will investigate weaknesses by discussing the theoretical background behind, and whenever possible, actually performing the attack. We will then discuss methods to prevent/reduce the vulnerability.
Objectives	create an awareness in the student as to how a medical laboratory is organised and managed. The first part of the course addresses the basic fundamentals of managerial practice in the laboratory setting. The managerial functions of planning, organising and controlling are introduced. The second part of the course deals with laboratory technical management - managerial activities specific to medical laboratories.
learning outcomes	To be able to discuss ethical cases using ethical principles 2. To ensure a sound ethical dimension to all cases in health care; acknowledging that each case has its ethical component. 3. To be able to understand and impart a proper informed consent process 4. To understand negligence and malpractice 5. To understand the principle of invoking double effect 6. To be able to distinguish between utilitarian approaches to health care, and, deontological approaches. 7. To understand what we mean by respecting the autonomy of patients.
Topics	The role of the laboratory in the health service - Laboratory customers - The organization of the hospital and the laboratory - The meaning of management - Organizational communication systems - Managerial duties, responsibilities and functions - The Management Cycle - Managerial Control, job descriptions and performance appraisal - Quality Control and method evaluation - Laboratory requisitions and reporting of results

	- Data management and information systems - Preventative maintenance programmes - Laboratory safety management - Laboratory accreditation - Basic principles of laboratory financial management - Budgeting - Workload analysis - Laboratory performance indicators and ratios - Inventory management.

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	**1**	Lectures
2	Final Exam 70%	**2**	PPT Slides
3	Total 100%	**3**	Exercises Practical

References:

-The Ethical Slut: A Practical Guide to Polyamory, Open Relationships & Other Adventures
Mar 10, 2009
by Dossie Easton and Janet W. Hardy

Course title	Clinical Chemistry II
Course code	**MLS416**
Level/ Semester	**L4/s1**
Crated hours	**3**
Course Description	This course builds on the theory, practical application, technical performance and evaluation of clinical chemistry laboratory procedures introduced in Clinical Chemistry I. Correlation of clinical laboratory data with the diagnosis and treatment of carbohydrate, renal, liver, cardiac, lipid, protein, and pancreatic and endocrine disorders, as well as acid-base and electrolyte disturbances, is emphasized.
Objectives	Upon successful completion of Clinical Chemistry II, the medical laboratory student will: 1. Demonstrate a working knowledge of the theory and techniques utilized in standard laboratory procedures applied to Chemistry. 2. Perform manual and automated laboratory procedures with accuracy and efficiency to provide quality patient care. 3. Perform routine maintenance and basic troubleshooting techniques properly. 4. Evaluate the validity of test results by correlating interfering substances, QC results, test conditions and specimen integrity. 5. Perform calculations without error to ensure the reporting of accurate and valid test results. 6. Correlate test results with normal and abnormal physiologic conditions. 7. Demonstrate the ability to effectively communicate with the health care team, peers, patients and the public. 8. Effectively utilize clinical information systems to access and process patient data..
learning outcomes	**KNOWLEDGE AND UNDERSTANDING:**

By the end of the course, students should be able to:

1. Define the metabolic pathways of carbohydrates, lipids, proteins, nucleotides and their micro-molecules and determine the site of each.(a1,2)
2. Illustrate the steps and regulatory mechanisms of these pathways. .(a1,2)
3. Point out the related metabolic disorders and their clinical prints on biochemical and molecular basis.(a5,6)
4. Describe micronutrients, their biochemical, clinical and laboratory importance and deficiency manifestations of each.(a1,9)
5. Describe the components of some body fluids; viz. blood, urine, milk, Semen, CSF and sweat. (a1)

2- b) Practical Skills:

By the end of the course, students should be able to:

1. Identify the physical and chemical characters of normal urine under different physiological conditions.(b1)
2. Perform chemical tests to detect abnormal constituents of urine.(b1)
3. Estimate serum levels of glucose, total proteins, albumin, (b1)
4. cholesterol, creatinine and uric acid by colorimetric methods.(b1)
5. Assess glucose tolerance by glucose tolerance

test.(b1)

c. Professional Attitude and Behavioral Skills.

1-Respect and follow the institutional code of conduct.(c6)

d. Communication Skills:

By the end of the course, students should be able to:

1-Work effectively in a group in lab . (d2,d6)

2- Respects the role of staff and co-staff members regardless of degree or occupation.(d2,d6)

e Intellectual Skills

By the end of the course, students should be able to:

1. Interpret symptoms, signs and biochemical laboratory findings of some metabolic disorders.e1,2,3
2. Interpret urine report outcome. e1,2,3
3. Point out the significance of determination of serum levels of glucose, total proteins, albumin, cholesterol, creatinine and uric acid. e1,2,3
4. Diagnose the type of abnormality of pathological glucose tolerance curve e1,2,3
5. Identify electrophoresis bands and comment on them**.** e1,2
6. Diagnose a metabolic disturbance etiology on basis of case-study reports. e1,2,3

f. General and Transferable Skills

1- Use efficiently sources of biomedical information to remain current with advances in knowledge and practice.f1,2,4

2- Present information clearly in written, electronic and verbal forms during preparation of seminars.f3,5

3- Communicate ideas and arguments effectively f3,4,5

4- Manage time and resources effectively and set priorities f6

Topics

- **Analytical Techniques and Instrumentation**
- Methodologies Used in Chemistry
- Electrophoresis
- Basic Principles of Spectrophotometry
- Automation in the Clinical Laboratory
- Electrochemical Analysis and Cooximetry
- **Analytes**
- Proteins
- Enzymes
- Carbohydrate Function and Metabolism
- Lipid and Lipoprotein Function and Metabolism
- Major Electrolytes: Na, K, Cl and HCO3- (tCO2)
- Trace Elements
- Blood Gas Analysis and Acid-Base Disorders
- **Specialty Testing**

- Therapeutic Drug Monitoring
- Toxicology
- Tumor Markers
- **Assessment of Organ System Function I**
- Osmolality and Fluid Balance
- Blood Gas Analysis and Acid-Base Disorders
- Renal Function
- Liver Function
- Cardiac Markers
- Pancreatic/Gastrointestinal Function
- **Assessment of Organ System Function II**
- Hypothalamus and Pituitary Function
- Thyroid Gland: Function, Testing, and Disorders
- Calcium Homeostasis and Parathyroid Hormone Reproductive Hormones: Testing and Disorders
- Adrenal Glands: Function, Testing and Disorders .

Practical part

- Selected experiment on above topics

No	EVALUATION	No	TEACHING METHODS
A	**Theoretical examination: 60%**	**1**	Lectures
1	Continuous periodic assessment 20 %	**2**	PPT Slides
2	Final examination 40%	**3**	Exercises Practical
B	**Practical examination 40%**		ـــــ
١	Continuous periodic assessment 20 %		ـــــ
٢	Final examination 20%		ـــــ
	Total 100%		ـــــ

References:

Required Textbook: 1. Bishop ML, Fody EP, & Schoeff L. (2010). *Clinical Chemistry: Techniques, Principles, Correlations* (6th ed.). Baltimore, MD: Lippincott Williams & Wilkins. ISBN: 978-0-7817-9045-1

Major References: 1. *MTS Laboratory Training Library: Protein Electrophoresis*, University of Washington Department of Laboratory Medicine. http://www.medtraining.org/ltl

2. Department Procedure Manuals.

Additional Reference: 1. Burtis CA, Ashwood ER, Bruns DE. (2008). *Tietz Fundamentals of Clinical Chemistry (*6th ed.). Philadelphia, PA: W.B. Saunders.

SECOND SEMESTER

OF

FOURTH YEAR

Course title	**Thesis project**
Course code	**MLS421**
Level/ Semester	**L4/s2**
Crated hours	**16 week**
Course Description	Training on project establishment and methodology of execution including literature reviewed and use scientific information resources
Objectives	To apply research skills into a research study, undertake fieldwork and present a dissertation. Summarizes and provides a final integration of knowledge, skills and attitudes developed during the four years in subjects related to medical laboratories. Each student carries out a project relevant to current medical laboratories. development and practice in the hospital, community and different industry and/or research laboratory, and writes a critical report of relevant knowledge, novel observations and findings.
learning outcomes	**- KNOWLEDGE & UNDERSTANDING:** a1-Define the Principles of research planning and design a2- Describe principles of basics of experimental design and analysis. **b- INTELLECTUAL SKILLS** b1- Identify suitable research topics. b2- Undertake independent research. b3- Be able to do Critical review and analysis of related literature. **c-PROFESSIONAL AND PRACTICAL SKILLS** c1- Design research study c2- Perform method validation and presentation of research report. c3- Write the research proposal and theses. **d- GENERAL AND TRANSFERABLE SKILLS** d1-Demonstrate appropriate communication skills. d2- Present clearly and effectively scientific topic in a tutorial or a staff meeting. d3- Work separately or in a team to research and prepare a scientific topic.
Topics	• Development of a research protocol

	• Fieldwork and data analysis • This research project course involves the generation of new scientific information and a review and understanding of the scientific literature. • The research may be conducted in a laboratory, hospital, community laboratories, different company, etc., depending on the project and the supervisor. • Students are divided into groups and each group is working together. • Students are expected to work approximately 72 hours. This will include working in the laboratory, etc., reading or searching literature, and writing up the research project. • Fields of study available may include: o Medicinal chemistry o Virology , serology, and mycology o Community laboratory o Toxicology. o Biochemistry o Industrial microbiology o Epidemiology and communicable disease

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	**1**	Lectures
2	Final Exam 70%	**2**	PPT Slides
3	Total 100%	**3**	Exercises Practical

Course title	**LABORATORY ADMINISTRATION AND QUALITY CONTROL**
Course code	**MLS422**
Level/ Semester	**L4/S2**
Crated hours	**2**
Course Description	Total Quality Management (TQM) is a scientific approach for management and employees to be involved in the continuous improvement of processes underlying the production of goods and services. This approach is fundamental in lab, industry, evidence-based medicine and many other disciplines.
Objectives	To familiarize students with: Types & nature of clinical laboratories. Basic fundamentals of administration & supervision. Manpower competency assessment in clinical laboratories. Distribution of responsibilities. Safety methods. Regulations of ordering & storing Lab supplies & Maintenance And will including method evaluation, reference intervals, quality control, developing standard operating procedures, and compliance. The laboratory will emphasize techniques for method evaluation, establishing reference intervals, quality control, and compliance with regulatory agencies
learning outcomes	□ Knowledge and understanding The students should be able to know how to establish a laboratory managing system □ Cognitive skills (thinking and analysis). The students will learn the ability to correlate between different problems and problem solving abilities □ Communication skills (personal and academic). NA □ Practical and subject specific skills (Transferable Skills).

	NA
Topics	*Course Title:* LABORATORY ADMINISTRATION UNIT CONTENTS HOURS UNIT 1 - Management Definition 1 hour UNIT 2 - Management Theories 2 hours UNIT 3 - Management functions 1 hour UNIT 4 - Planning Process 2 hours UNIT 5 - Laboratory Organization 2 hours UNIT 6 - Staffing of Lab. 2 hours a. job description b. Performance appraisal UNIT 7 - Problem Solving : Decision making 2 hours UNIT 8 - Materials management 1 hour UNIT 9 - Communication Skills 1 hour UNIT 10 - Information System 1 hour I. Defining a Quality Assurance (QA) Plan II. Specimen Collection, Preservation, & Transport (this topic is briefly addressed in lecture and is more thoroughly discussed in the Laboratory) III. Standards of Performance IV. Equipment-QA V. Reagents-QA VI. Safety Systems VII. Method Evaluation A. Method Evaluation Plan B. Variability C. Evaluation of Random Error in a Method D. Comparison Studies VIII. Internal and External Quality Cont IX. Output Control: Requisitioning and Reporting X. The Reference Interval (Normal Range) A. Definition B. “Subject-Based” and “Group-Based”

C. Sensitivity and Specificity
D. Logarithmic Transformations

XI. Budget Analysis

XII. Administration
- A. Goals and objectives
- B. Laboratory Design and Organization
- C. Purchasing and Inventory
- D. Personnel
  1. Motivation Theory
  2. Personnel management
     - a. policy manual
     - b. recruiting, selecting, and evaluating employees
     - c. communication
- E. Preparing a Budget
- F. Continuous Quality Improvement
- G. Standard Operating Procedures
- H. Compliance

Main Teaching Strategies:

Lectures with audiovisual aids.

- Visits to different sections of clinical laboratories and medical stores in

the hospitals.

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	1	Lectures
2	Final Exam 70%	2	PPT Slides
3	Total 100%	3	Exercises Practical

References:

The practice of supervision and management, by

Martinko ; Mcgraw-Hill

- Management information system, by Davis; Mcgraw-Hill

- Fundamentals of management, by Ivancevich; IRWIN

Course title	**Seminars on medical laboratory technology**
Course code	**MLS423**
Level/ Semester	**L4/S2**
Crated hours	**4**
Course Description	**This module is a major Department Requirement, It is based on discussion of a scientific issues related to the field,** it helps student to start predetermined project including data acquisition and analysis then write report under the supervision of a faculty staff member. **This will be done first by presenting a written report then preparing an oral** presentation.
Objectives	The main objective of this course is to gain experience in presenting scientific research results or any other data to audience using appropriate visual aids. **By the end of this course, student should be able to:** **- Conduct practical research** **- Collect data** **- Analyze data** **- Trouble shooting** **- Write research progress reports** 1. **Write a final "paper" format with presentation in form of seminar.**

	Course/ module Components and Teaching Methods: The course will start by two lectures (week one and three). Students will be asked to submit a report in week six. Then student will make appropriate changes to prepare a seminar using the report on the exact date that will be specified to each student. All registered students are expected to attend and evaluate other student's seminars
learning outcomes	**Upon successful completion of this module the student should be able to:** - Understand all instrument in medical laboratory -
Topics	- **Meeting deadlines and fellow-up early in the Semester** - Attend lecture in week 1 and week 3. - Select the subject and approved by the lecturer before the end of week 3. - Submit the report before the end of week 6. - Prepare seminar announcement one week before the seminar date. - Regular discussion with the lecturer and up to the presentation day. - **Written Report due in week 6** - Preparing a scientific term paper on the subject that you have selected using several scientific research papers from international journals. The report should be around 15 pages (double-spaced, plus citations). Your report should include background information, the findings, importance, potential applications, or other issues that the papers bring to light. Using books or the internet can provide good background information about the subject but not the core of the report. Copy/paste is easily identifiable and will be rejected. - **Seminar Summary & Announcement (Due one week before your seminar)** - A one page summary and announcement should be given to the lecturer one week before presentation day. The Summary should be in general terms (not specialized). Also should contain time and place of the presentation. - A final version should be announced on boards and to the department

staff member at least one week before the presentation date.

- **Attendance and evaluation of other students**
- Each registered student is expected to attend the seminars of all other class-mates. The students are expected to politely ask questions and to fill a confidential evaluation form of the seminar/speaker.
- **Oral Presentation**
- Each student will present the oral report to other class mates and the seminar is open to the public. Presentations should be 15-20 minutes followed by short question/answer session. The use of visual aids is very important. Your responsibility is to make sure to have ready every thing you need before the presentation time.

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	1	Lectures
2	Final Exam 70%	2	PPT Slides
3	Total 100%	3	Exercises Practical

Course title	**Toxicology and therapeutic assay**
Course code	**MLS424**
Level/ Semester	**L4/S2**
Crated hours	**2**
Course Description	Adverse health effects of exposure to drugs or substances of abuse. Covers principles of toxicodynamics, toxicokinetics, biotransformation, diagnosis and treatment. Emphasis will be placed on mechanism(s) of action of the various drug classes, body system(s) affected, clinical manifestations of problems and the resulting adverse effects on human health and society. Methods of treatment and client education will also be addressed. Laws controlling and governing the use of these drugs/substances and the agencies responsible for them will also be covered.
Objectives	Having successfully completed this course, the student will be able to: 1. Identify the major drugs of abuse 2. Demonstrate an understanding of the adverse health effects of drug abuse by discussing the major clinical symptoms caused by each drug. 3. Outline a client education program to persuade individuals not to abuse these drugs. 4. List laws and government agencies responsible for regulating and governing their use.
learning outcomes	• Knowledge and understanding Cognitive skills (thinking and analysis). **Interpret, analyze & evaluate information in the literature** **Possess self learning skills, problem solving & critical thinking abilities** Communication skills (personal and academic). **- Write clear concise & organized communication. Give oral presentati** **to small & large groups**

	Practical and subject specific skills (Transferable Skills). **Students will apply most of the acquired knowledge from the theoretical lectures in the co- requisite practical laboratory. The theoretical information also allows them to be able to perform a research & experimental work**
Topics	-Introduction to Toxicology. - History & Scope of toxicology. - Classification of toxic agents. a. Toxic dynamic. b. Dose - response relationship in Toxicity. c. Routes of Exposure a)General characters, Symptom Treatment and Haemodialysis. b) Antidote Therapy. a. Cosmetics. b. Food poisoning (milk –Fish) - Botulism, Bacterial. Chemical food Poisson a. General prevention of Poisoning. B. Corrosive: acid, base, phenol. C. Gas poison: General Characters, toxicity mechanism of action, source, fatal Dose poisoning. Antidotes for the following: Carbon monoxide Cyanides D. Heavy metals poisoning: General characters, source ,action route & fatal dose, antidotes: Lead Arsenic Mercury General characters, classification, , route & Fatal Dose, toxicity action ,antidote:- - Chlorinated insecticides - - Organophosphorouse comp

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	1	Lectures
2	Final Exam 70%	2	PPT Slides
3	Total 100%	3	Exercises Practical

References:

1. Textbook of Pharmacology, C.M. Smith and A.M. Reynard. W.B.
2. Saunders Co., 1992. (1213 pp, Hardcover); (1995, Softcover, 680 pp)

2. Pharmacology. G.M. Brenner. W.B. Saunders Co., 2000, 509 pp.

3. Introduction To Pharmacology. M.A. Hollinger. Taylor and Francis, Washington, D.C., 1997, 291 pp.

4. Ellenhorn's Medical Toxicology: Diagnosis and Treatment of Human Poisoning, 2nd Ed. M.J. Ellenhorn. Williams and Wilkins, 1997, 2047 pp. (Also available in Softcover)

5. Pharmacology. H.P. Rang, M.M. Dale, J.M. Ritter and P. Gardner.
6. Churchill Livingstone, 1995. 855 pp.

7. The Pharmacological Basis of Therapeutics, 9th Ed. J.G. Hardman,

8. L.E. Limbird, R.B. Molinoff, R.W. Ruddon and A.G. Gilman.

9. McGraw-Hill, 1996. 1905 pp.

10. Basic and Clinical Pharmacology, 5th Ed. B.G. Katzung. Appleton and

11. Lange, 1992. 1017 pp.

12. Meylers Side Effects of Drugs, 12th Ed. M.N.G. Dukes, Elsevier, 1992.

13. 1308 pp

Course title	**Diagnostic Immunology**
Course code	**MLS425**
Level/ Semester	**L4/S2**
Crated hours	**3**
Course Description	This 3 credit hour course aims to introduce up to date, diagnostic (clinical) immunology concepts at a level suitable for students with prior exposure to basic immunology. Lectures and laboratory emphasize detection and identification of antigens, antibodies and the antigen-antibody reaction encountered and to be able to diagnose different diseases using one of them.
Objectives	By the end of this course, the medical Lab students should be able to: • Define the term "simple serological techniques". • Describe the benefit of the use of serological tests. • Define the term "titer". • Enumerate the environmental factors affecting the ag-ab interactions. • Enumerate the different immunological names give to antibodies. • Define the terms; prozone, equivalnce zone, and post zone. • Enumerate some examples of the major simple serological techniques, such as: - Agglutination reactions - Precipitation reactions • Explain the principle of the agglutination reactions • Enumerate some diagnostic test depend on the principle the of

	the agglutination reactions. • Explain the principle of the precipitation reactions • Enumerate some diagnostic test depend on the principle of the precipitation reaction. • Explain the terms; lattice, cross-reacting antibodies. Latex, charcoal, and agar. Discuss the identity, partial identity, and non-identity • Compare between agglutination and precipitation reactions. • Explain the Immunodiffusion (single and double diffusion) methods (Ouchterlony technique). • Explain the principle of the toxin-anti-toxin reaction. • Explain the term "flocculation reaction".
learning outcomes	**Cognitive skills (thinking and analysis):** - The instructor intends utilize his skills to present the material in the textbook in an interactive way that stimulates the thinking side of students. Analyzing schematics and mechanisms in immunological responses in different settings will be an integral part of this course. - Working groups should be able to discuss their results after experiment carry out, solve and discuss problems and trouble shootings. **Communication skills (personal and academic):** 7. Students will be encouraged to communicate their ideas with the instructor at all times during and after the class. 8. To facilitate discussions and asking questions, the instructor usually starts every lecture either by asking

	questions or giving a quiz about the previous lecture. 9. Raising questions and discussion of results with supervisor, brain storming and group work **Practical and subject specific skills (Transferable Skills):** 10. Some areas of immunology require specific skills in the transfer process of information from the instructor to the students. This, sometimes, might require the presentation of other instruments which will be very helpful if the students are enrolled in the laboratory class accompanying the immunology lecture class.
Topics	**1) Theoretic:** - Serology; introduction and importance. - Antigen, antibody and basis of antigen antibody reactions. Zone phenomenon. - Agglutination; slide agglutination and anti-globulin agglutination. - Latex agglutination (immunologic pregnancy test, rheumatoid factor latex test and CRP). Coagglutination, virus haenagglutination and heterophile antibodies agglutination tests. - Precipitation; tube precipitation, agar gel diffusion. - Precipitation in agar with an electric field; immunoelecrophoresis and Western Blot test.

- Complement fixation, toxin antitoxin neutralization and virus neutralization.
- Immunoflurescence (direct, indirect) and ELISA.
- Radioimmunoassay and immunochromatographic technique.
- Assessment of the immune competence; assessment of B cell competence, assessment of T cell competence, assessment of phagocytic functions and assessment of complement.
- Type one hypersensitivity mechanism and diagnosis.
- Automated Procedures - Instrumentation.

2) Practical:

- Bacterial agglutination
- Passive haemeagglutination
- Hemagglutination inhibition
- Precipitation
- Antitoxin neutralization
- Virus neutralization
- Immunoelectorophoresis
- Double diffusion in agar gel
- Complement fixation

	- Radial immunodiffusion - Radioimmunoassay (RIA) - Enzyme-linked immunosorbent assay (ELISA)

Methods of teaching	**Educational aid**	**evaluation**
- Lectures - Videos (animation) - Groups discussions	- Board - Data show	- Attendance; 5% - Quizzes; 5% - Midterm 10% - Final 40% - Practical 40%

References:

-Gabriel Virella, **Medical Immunology, 2001.**

-Parslow, Tristram G.; Stites, Daniel P.; Terr, Abba I.; Imboden, John B., 10th edition, **Medical Immunology, 2001.**

Course title	**Molecular Biology**
Course code	**MLS426**
Level/ Semester	**L3/S1**
Crated hours	**2**
Course Description	Inheritance in humans, including genetic mechanisms, Experiments in establishing the nature of genetic material, Translation and protein synthesis, human populations, medical syndromes, eugenics, and genetic counseling. Does not count toward biology major.
Objectives	1- advances in molecular biology and computer science have created a synergy that is allowing geneticists to investigate fascinating questions that we would not have thought possible just a few decades ago. 2- The ability to sequence entire genomes and to handle this large amount of data rapidly has allowed the scientific community to discover the complete genomic sequences of organisms ranging from bacteria to humans. 6- Determine the function of genes that direct how we as humans develop and function. Moreover, these studies are helping to identify genes that when mutated cause disease. 7- These discoveries are having incredible social, medical, economical, and political impacts that we all will have to consider at some point. 8- Thus- it is an exciting time to become a geneticist – even if only for one semester The objective of this course is to explore the mechanisms of human heredity and how our understanding of them is revealed by scientific

	experimentation. 9- The location, transmission, structure and function of genes encoding specific traits are discussed. The effect of mutations, genes implicated in human genetic disease, and population genetics are dealt with, as well as how issues such as recombinant DNA technology, gene therapy, genetically modified foods, AIDS and cancer impact our society.
learning outcomes	**Knowledge and understanding** -Review the structures and functions of nucleic acids and proteins -Describes the Molecular Mechanisms of DNA replication -Describe the Molecular mechanisms involved in gene transcription and translation -Appreciate the role of protein structure in function **Cognitive skills (thinking and analysis)** - Analyzing, summarizing and integrating information from a variety of media. - Gain Self-management and professional development such as skills necessary for self managed and lifelong learning (working independently, time management, organization). **Communication skills (personal and academic)** -For every lecture the last five minutes will be open for discussion. For further discussion, the students are welcome at the lecturer.s office hour as appeared in first page. -The students have the option to submit their module activities either by email or by hand

Topics	**Theoretic:** 1) The genetic material 2) Experiments in establishing the nature of genetic material 3) DNA structure 4) DNA denaturation 5) Nucleic acids and their integration with other macromolecules to form cellular components 6) Levels of protein structure 7) The double helix 8) Different kinds of RNA 9) DNA replication (different hypotheses) 10) DNA transcription 11) Translation and protein synthesis 12) The genetic code 13) The molecular basis of mutation 14) Gene expression 15) Enzymes 16) PCR technique

No	EVALUATION	No	TEACHING METHODS
1	Continuous periodic assessment + Midterm exam 30 %.	**1**	Lectures
2	Final Exam 70%	**2**	PPT Slides
3	Total 100%	**3**	Exercises Practical

Main text books :

- Albert et al., (1994). The Molecular Biology of the Cell. Garland Publishing, Inc. New York.
- Karp, (1996). Cell and Molecular Biology, John Wiley and Sons Inc, New York, USA.
- Frefelder, (1994). Molcular Biology. Jone and Bartlett, London, U.K.
- Sheales, Birchi, (1983). Cell & Molcular Biology. John Wiley and Sons, Inc. New York. USA.
- F. W. Price, (1979). Basic Molecular Biology. John Wiley and Sons, Inc., New York. USA.