



University of Tripoli
Faculty of Medicine



Curriculum **of** **Bachelor of Medicine** **and Surgery** **M.B.B.Ch. Program** **(Year-Based Program)**

**For Students who joined From the academic
year 1995/1996 to 2012/2013**

Tripoli, Libya



Introduction

The Faculty of Medicine at the University of Tripoli was established in October 1974. Since its inception, the faculty adopted a year-based system, which remained in place until the academic year 2013/2014, when it was replaced by a semester-based program.

The syllabus is reviewed regularly, with minor adjustments occasionally introduced to align with developments in the medical field. These updates are implemented without significant changes to the overall teaching hours or core topics.

This is the most recent version of the curriculum prior to the adoption of the semester-based program. It outlines the curriculum approved by the Dean's Council for students who joined the academic years from 1995/1996 till 2012/2013. The premedical year is considered as an introductory year and a requirement to join the Core Medical Program.

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UNIVERSITY OF TRIPOLI

FACULTY OF MEDICINE

M.B.B.Ch. Program

Introduction

This Year-Based Program Syllabus contains the study plan for the full program to obtain a Bachelor of Medicine and Surgery certification. This updated Syllabus covers students joined the Premedical Year from the academic year 1995/1996 till 2012/2013. The program has been changed to Semester-Based in the Academic Year 2013-2014.

Admission Requirements:

Limited numbers are admitted annually in the faculty of Medicine. In order to be accepted, students with excellent grades ($\geq 85\%$) in Medical Sciences Branch of the General Libyan Secondary Education Certificate, have to pass a competition exam of general & medical knowledge put by the faculty of Medicine.

Program Duration:

The study in the Faculty of Medicine, Tripoli University includes seven years of academic and clinical training including a premedical year and an internship year.

Program Structure:

- **Premedical Year:** one year of courses taught through the faculty of Sciences, University of Tripoli.
- **First Stage (1st and 2nd Medical Years-Basic Medical Sciences):**
 - First Medical Year.
 - Second Medical Year.
- **Second Stage (3rd Medical Year-Basic Medical Sciences):**
 - Third Medical Year.
- **Third Stage (4th and 5th Medical Years-Clinical & Applied Medical Sciences):**
 - Fourth Medical Year.
 - Fifth Medical Year.
- **Fourth Stage (Internship Year-Clinical Rotations):**
 - A compulsory One-Year rotational training at Tripoli Teaching Hospitals.

Examination Schedule:

Exams of the premedical year and the 1st, 2nd, & 3rd years are held as follows:

- Mid-Year Exams.
- Final Exams.
- Reset Exams.

Teaching Program

Premedical Year:

- Pre-medical year is held at the faculty of sciences.
- It includes courses of Biology, General & Organic Chemistry, Medical Physics, Biostatistics, English Language, Arabic Language & Psychology.
- Students should pass all exams of the premedical year before they are allowed to register in the 1st medical year.

First Stage (1st & 2nd Medical Years):

- It consists of the 1st and 2nd medical years, that includes four basic medical science courses; Anatomy, Physiology, Biochemistry & Histology.
- Students should pass all the courses of the first stage (1st and 2nd years) before they are allowed to register in the second stage.

Second Stage (3rd medical year):

- It is the 3rd medical year that includes four basic medical science courses; Pathology, Pharmacology, Microbiology, & Parasitology.
- Students should pass all the courses of this stage before they are allowed to register in the next 3rd stage.

Third Stage (4th & 5th Medical Years):

A. The 4th Year Medicine:

- Introduction to Medicine and Surgery: (16 weeks)
 - Eight weeks for Medicine and Eight Weeks for Surgery.
- 4th Year Program: (28 Weeks)
 - They study four courses (6 days/week each); Ophthalmology, Forensic Medicine & Toxicology, Obstetrics & Gynecology, and Public Health & Community Medicine.
 - The courses are divided as follows:
 - Obstetrics & Gynecology: 12 Weeks
 - Public Health & Community Medicine: 8 Weeks
 - Forensic Medicine & Toxicology: 4 Weeks
 - Ophthalmology: 4 Weeks
 - Assessment Exams are held at the end of each course.

B. The 5th Year Medicine:

- In the 5th year of medicine, the students study Internal Medicine, Surgery, and Pediatrics.
- It includes Lectures, Discussions and Clinical Training.
- The 5th year program time-line is divided as follows:
 - Internal Medicine: 18 Weeks
 - Surgery: 18 Weeks
 - Pediatrics: 12 Weeks

- Students who successfully complete all the courses of the stage are declared passed in the Medical Program and are allowed to proceed to the Fourth Stage (Internship).
- Exam duration is not calculated within the Course time; additional time is allocated for conducting the examinations in all study stages.

Fourth Stage (Internship Year):

In this final stage, the students should do a full year of internship at different clinical departments of teaching hospitals.

Grading System:

- Grades are calculated for each subject as follows:

Grades	From - To	Marks allocated for different subjects				
		100	150	200	250	300
Excellent	$\geq 85\% - 100\%$	85- 100	127.5-150	170 - 200	212.5 - 100	255-300
Very good	$\geq 75\% - < 85\%$	75 – 84.9	112.5-127.4	150 - 169.9	187.5 - 212.4	225-254.9
Good	$\geq 65\% - < 75\%$	65 - 74.9	97.5-112.4	130 - 149.9	162.5 - 187.4	195-224.9
Pass	$\geq 60\% - < 65\%$	60 - 64.9	90-97.4	120 - 129.9	150 - 162.4	180-194.9
Weak	$\geq 35\% - < 60\%$	35-59.9	52.5-89.9	70 - 119.9	87.5 - 149.9	105-179.9
Very weak	$\geq 0\% - < 35\%$	0-34.9	0-52.4	0 - 69.9	0 - 87.4	0-104.9

- The general grade for an academic year is calculated as the average of the scored marks in all principal subjects only.
- The general grade for graduation is calculated as the average of the scored marks in all principal subjects for all the academic stages (except the premedical).
- The passing score for each subject is 50% in the pre-medical year and 60% in the first, second, and third stages of the medical program.
- The M.B.B.Ch. degree with honors is awarded to students who achieve a cumulative average grade of at least "Very Good."

Teaching Hours:**Premedical Year:**

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
General Biology	75	75		150
Botany	75	75		150
Medical Physics	90	90		180
General Chemistry	90	90		180
English	30		30	60
Biostatistics	30		30	60
Arabic Language	30			30
Total hours of study in the Premedical year				810

First Stage (1st & 2nd medical years):

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Anatomy and Embryology	100	300	50	450
Histology and Genetics	50	100	50	200
Physiology	145	90	90	325
Biochemistry	156	120	90	366
Total hours of study in the first and second years				1341

Second Stage (3rd medical year):

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Pharmacology	120	100	50	270
Pathology	120	80	80	280
Microbiology and Immunology	100	80	30	210
Parasitology	40	50	20	110
Total hours of study in the third year				870

Third Stage (4th & 5th medical years):

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Principle of Medicine 4 th year	80	-	32	128	240
Principle of Surgery 4 th year	80	-	32	128	240
Community Medicine	105	50	46	140	341
Forensic and Toxicology	60	30	31	125	246
Ophthalmology	35	20	46	188	289
Gynecology and Obstetric	95	60	93	375	623
Pediatrics	60	120	93	375	648
General and Special Medicine	160	100	185	751	1196
General and Special Surgery	200	150	183	753	1286
Total hours of study in the fourth and fifth years					5109

Fourth Stage (Internship Year):

After successfully passing all the courses, the students will spend one-year internship (12 months) at different clinical departments of the teaching hospitals as follows:

Department	Surgery	Internal Medicine	Pediatrics	Obstetrics & Gynecology	Community medicine	Elective
Duration	3 months	3 months	2 months	2 months	1 month	1 month

From June 2018 onwards the one-year internship has adopted a weekly based program (52 weeks). This is to accommodate both emergency medicine and psychiatry within the one calendar year time frame:

Department	Surgery	Internal Medicine	Pediatrics	Obstetrics & Gynecology	Community Medicine	Emergency	Psychiatry & Elective*
Duration	12 weeks	12 weeks	8 weeks	8 weeks	4 weeks	4 weeks	4 weeks

* Two weeks for psychiatry and two weeks for elective.

Distribution of Assessment Marks:

Premedical Year							
Subject	Zoology	Botany	Medical Physics	Chemistry	Biostatistics	English Language	Arabic Language
Total Grade	100	100	100	100	100	100	100
Midterms	30	30	30	30	30	30	30
Written Exam	70	70	70	70	70	70	70

First Stage (First and Second Years)								
Subject	Anatomy		Histology		Physiology		Biochemistry	
Total Grade	300		200		300		300	
Midterms	20%	60	20%	40	20%	60	20%	60
Written Exam	50%	150	50%	100	60%	180	60%	180
Practical Exam	20%	60	20%	40	10%	30	10%	30
Oral Exam	10%	30	10%	20	10%	30	10%	30

Second Stage (Third Year)								
Subject	Pharmacology		Pathology		Microbiology		Parasitology	
Total Grade	300		300		200		100	
Midterms	20%	60	20%	60	20%	40	20%	20
Written Exam 1	60%	180	25%	75	45%	90	45%	45
Written Exam 2	10%	30	25%	75	20%	40		
Practical Exam			20%	60			20%	20
Oral Exam	10%	30	10%	30	15%	30	15%	15

Third Stage (Fourth Year)								
Subject	Obstetrics & Gynecology		Community Medicine		Forensic & Toxicology		Ophthalmology	
Total Grade	200		200		100		100	
Midterms	5%	10	20%	40	15%	15		
Written Exam 1	25%	50	30%	60	55%	55	40%	40
Written Exam 2	15%	30	25%	50				
Practical/ Slides Exam			10%	20	10%	10	20%	20
Oral Exam/ (OSCE)	15%	30	15%	30	20%	20		
Clinical Exam (OSCE)	25%	50						
Clinical Exam	15%	30					40%	40

Third Stage (Fifth Year)						
Subject	Surgery		Medicine		Pediatrics	
Total Grade	300		300		200	
Midterms					15%	30
Written Exam 1	16.7%	50	20%	60	35%	70
Written Exam 2	16.7%	50	20%	60		
Oral Exam	26.7%	80	13.3%	40		
Clinical Exam	40%	120	46.7%	140	50%	100

PROGRAM COURSES**PREMEDICAL YEAR**

Premedical Year is compulsory one year in which the students gain knowledge about basic life sciences in; Biology, Chemistry, Physics, Biostatistics, Psychology, and English language. The study includes assessment examination, final examination (two attempts).

GENERAL BIOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
General Biology	75	75		150

Course Objectives:

This course aims to provide medical sciences students with the knowledge and understanding of:

- The basic structure of living cells.
- The different functional activities of the cell.
- The levels of body organization of cells, tissues, organs & systems.
- Basic structure of selected body systems.
- Basic principles of general embryology.
- Basics of Mendelian genetics.

Syllabus:**I. Cytology and Histology:****A. Introduction to biological sciences:**

Manifestation of life.

B. Cell structure and function:

1. Prokaryotes and Eukaryotes.
2. Cell organelles.

C. Nucleus:

1. RNA.
2. Transfer RNA.
3. Ribosomal RNA.
4. Transcription of DNA to RNA.
5. Protein synthesis.

D. Cell reproduction:

1. Chromosome.
2. Cell cycle.
3. Cell division (Mitosis and Meiosis).

E. Energy and living cells:

1. Chief energy sources; ATP and Phospho-creatine.
2. Aerobic versus anaerobic metabolism.
3. Biological oxidation and control of energy release in the cell.
4. Photosynthesis and respiration.

F. Tissue classification.**G. Body fluids and kidney:**

1. Body fluid volume and composition.
2. Structure of a nephron and mechanism of urine formation.
3. Kidney functions including body fluid regulation.
- H. Endocrines:**
 1. Hormones type and mode of action.
 2. Sources and functions of important hormones.
- I. Nervous System:**
 1. Organization of nervous system for transfer of information.
 2. Parts of nervous system.
 3. Brain and main functions of different parts.
 4. Spinal cord and reflex action.
 5. Autonomic nervous system.
- J. Special senses:**
 1. Eye: parts, visual receptors and image formation.
 2. Ear: external, middle and internal ear, functions and basic mechanism of hearing.
- II. Embryology:**
 - A. Male and female genital system.**
 - B. Fertilization.**
 - C. Cleavage.**
 - D. Early embryogenesis, blastulation, gastrulation and neurulation.**
 - E. Fetal period.**
- III. Genetics:**
 - A. Information, coding and transfer:**
 1. DNA structure and replication.
 2. Structure of chromosomes.
 - B. Mendelian genetics:**
 1. Mendelian methods.
 2. Test cross.
 3. Gene pairs.
 4. Mutations.
 5. Mendelian laws (1 and 2).
 6. Lethal and multiple alleles.
 7. Crossing over.
- IV. Practical Medical Biology.**

List of References:

1. The world of the cell, Jeff Hardin, Gregory Bertoni and Lewis J. Kleinsmith
2. Campbell Biology by Jane B. Reece, Lisa A. Urry, Michael L. Cain and Steven A. Wasserman

BOTANY

Subject	Lectures (Total hours)	Practical (Total hours)	Tutorials (Total hours)	Total
Botany	75	75		150

Syllabus:**1. Introduction to Botany**

- Definition of Botany: The study of plants, focusing on structure, functions, classification, and environmental interactions.
- Importance: Botany's contributions to agriculture, pharmaceuticals, and environmental conservation.
- History: Evolution of botany from ancient civilizations to modern science.
- Applied Fields: Agricultural, medicinal, environmental, and industrial botany.

2. Plant Cell

- Cellular Structure of Plants: Study of the basic components of the plant cell, such as the cell wall, nucleus, mitochondria, chloroplasts, and vacuoles.
- Functions of Various Cell Parts: Role of chloroplasts in photosynthesis, vacuoles in water storage.
- Difference Between Plant and Animal Cells: Unique features of plant cells, such as cell walls, chlorophyll, and large vacuoles.

3. Parts of the Plant

- Roots: The role of roots in anchoring the plant and absorbing water and nutrients.
- Stem: The transport of materials through vascular tissues, and support of the plant.
- Leaves: Photosynthesis process, leaf structure.
- Flowers: Reproductive structures and their role in sexual reproduction.
- Fruits: How fruits develop and seed dispersal mechanisms.

4. General Characteristics of Plants

- General Characteristics of Plants: Plants are living organisms that perform photosynthesis, have cell walls, and reproduce sexually and asexually.
- Plant Classification: How plants are classified into kingdoms (e.g., plants, gymnosperms, angiosperms).
- Relationship with the Environment: Adaptations of plants to various environments.

5. Plant Tissues

- Ground Tissues: Parenchyma, collenchyma, sclerenchyma.
- Vascular Tissues: Xylem and phloem for nutrient transport.
- Meristematic Tissues: Growth and elongation.
- Reproductive Tissues: Involved in plant reproduction.

6. Reproduction in Plants

- Sexual Reproduction: Pollination and fertilization, flower role.
- Asexual Reproduction: Vegetative methods like cuttings and layering.
- Spore Formation: Seen in ferns and fungi.
- Flowering Plants: Pollination influences fertilization.

7. Microscopic Structure of the Plant Cell

- Microscopic Structure of Plant Cells: Observing cells under a microscope, structure of components like the cell wall and chloroplasts.
- Internal Structure of Plant Cells: How each part of the cell functions in coordination.

8. Bacteria

- Introduction to Bacteria: Characteristics of bacteria as microorganisms.
- Role of Bacteria in Soil and Plants: Nitrogen-fixing bacteria, pathogenic bacteria.
- Interactions Between Bacteria and Plants: How affect plant growth and diseases.

9. Virus

- Viruses: How viruses affect health.
- Types of Viruses: viral diseases, methods of virus transmission.

10. Fungi

- Fungi: Definition of fungi, their different types (e.g., molds, parasitic fungi).
- Role of Fungi in the Environment: impact of fungi on soil, plants, and other organisms.
- Fungi Causing Diseases: Such as rusts, molds, and parasitic fungi.

11. Algae

- Introduction to Algae: Characteristics of algae as simple plant-like organisms.
- Types of Algae: Green algae, red algae, and brown algae.
- Role of Algae in the Environment: Algae as oxygen producers, part of aquatic food chains.

12. Medicinal Plants

- Definition of Medicinal Plants: Plants with therapeutic properties.
- Historical and Modern Uses: From ancient remedies to modern pharmaceuticals.
- Examples of Medicinal Plants
- Chemical Compounds: Alkaloids, terpenoids, essential oils, flavonoids, glycosides.
- Current Applications: In medicine, supplements, and aromatherapy.
- Challenges and Future: Research obstacles, conservation, and discovery of new medicinal plants.

List of References:

1. The Medicinal Plants of the World" - Ben-Erik van Wyk.
2. Fundamentals of Pharmacognosy and phytotherapy Michael Heinrich

GENERAL CHEMISTRY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
General Chemistry	90	90	...	180

Course Objectives:

This course aims to provide medical sciences students with the knowledge and understanding of:

- The basic structure of the atom, chemical elements, molecules & compounds.
- Basic chemical measurements.
- The acids, bases & Ph.
- Laws of the gaseous state.
- Chemical thermodynamics.
- Organic & inorganic compounds.

Syllabus:**A. Chemical elements and atomic structure:**

1. Matter and elements.
2. Atomic structure.
3. Isotope, isobars and atomic weight.
4. Ions.
5. Electrolytes.
6. Free radicals.

B. Molecules, compounds, and chemical bonds:

1. Molecules and compound.
2. Chemical formula.
3. Molecular weight.
4. Chemical bonds.
5. Chemical equation.
6. Solution, colloids and suspension.

C. Measurement of concentration:

1. Weight per volume.
2. Percentages.
3. Molarity.
4. Electrolyte concentration.
5. Molarity, mole fraction and normality.

D. Acid, base and pH:

1. Acid and base.
2. PH.
3. Hydrolysis.

E. Gaseous state:

1. Boyle's law.
2. Charle's law.
3. Avogadro's law.
4. Dalton's law.
5. The universal gas law.
6. The kinetic theory of gases.
7. Gas equations for ideal non-ideal gases.

F. Thermochemistry:

1. Energy change in chemical reactions.
2. Enthalpy.
3. Standard enthalpies for formation of reaction.
4. Hess's law.

G. Chemical thermodynamics:

1. The first law of thermodynamics.
2. Entropy and second law of thermodynamics.
3. Gibbs free energy.
4. Thermodynamic and metabolism.

H. Chemical equilibrium:

1. The concepts of equilibrium.
2. Equilibrium constant.
3. Homogenous and heterogeneous equilibrium and multiple equilibrium.
4. Factors affecting chemical equilibrium "Le-Chateliers principle".

I. Chemical kinetics:

1. The rate of reactions.
2. The rate laws.
3. First-order reaction.
4. Second-order reaction.
5. Arrhenius equation.

J. Difference between organic and inorganic compounds:

1. Hybridized orbitals.
2. Classes of organic.
3. Saturated hydrocarbons.
4. Unsaturated hydrocarbons.
5. Aromatic compounds.
6. Alcohols, ethers, ketones, aldehydes, carboxylic acid, esters, amines, thio-alcohols and phenols.

K. Practical Medical Chemistry.**List of References:**

1. General Chemistry: The Essential Concepts Raymond Chang
2. Organic Chemistry 2nd edition by Joseph Hornback.

MEDICAL PHYSICS

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Medical Physics	90	90		180

Course Objectives:

This course aims to provide medical sciences students with the knowledge and understanding of:

- Basics of Biomechanics.
- Properties of the matter.
- Principles of optics, sounds & heat.
- The biological effect of radiation.

Syllabus:**I. Mechanics:**

- Vectors: equilibrium and moment of force (Biomechanics).
- Kinematics: one dimension, two dimensions, motion on a curve.
- Circular motion: rolling, simple harmonic motion.
- Dynamics: Newton's second Law, centripetal, and centrifugal acceleration.
- Work, energy and power: conservation of energy, conservative forces; work in P-V system, applications; power, units of power, and efficiency.
- Conservation of linear momentum: impulse, collision, moment of momentum, angular momentum, and conservation law.

II. Properties of matter:

- Hydrostatics: Units of pressure, gauge pressure, absolute pressure, pressure inside fluid, Pascal principle, Pressure gauge, Buoyancy.
- Surface tension: Coefficient of surface tension, Liquid drops, bubbles, membranes, cylindrical and spherical membranes.
- Elasticity: Elastic and inelastic materials, biological material, stress, strain, Hooke's law, Shearing and twisting; Bulk modulus, compressibility, Stress and strain in biological systems, Energy in distortion, elastic constant, elastic membranes, Blood vessels, the Heart and circulatory system.
- Hydrodynamics: Laminar and turbulent flow, continuity equation, ideal fluid, Bernoulli equation, applications, abnormal blood vessels (stenosis, flutter), nonideal fluids, work done by heart in one beat, viscosity, Poiseuille's Law, flow resistance, vascular beds, sedimentation and centrifugation.

III. Optics:

- Wave theory of light, reflection and refraction at spherical surfaces.
- Lenses the optical instrument.
- The eye; color blindness, myopia, hyperopia, astigmatism, and glaucoma.
- Microscopes; electron microscope, laser and its application in medicine.
- Spectrophotometry, interference, diffraction, and polarization.

IV. Sound and Heat:

- Sound wave, velocity of waves in elastic media.
- Acoustic, impedance, intensity and intensity level.
- Damping, resonance, standing waves, Doppler effect, and ultrasound.
- The ear and hearing.
- Heat and first law of thermodynamic.
- Heat transfer and thermal properties of gases.

V. Modern Physics:

- Atomic structure.
- X-ray production and absorption (photoelectric effect, Compton effect).
- The nature of radioactive emissions, radioactive decay, isotopes application, dosimeters, radiation detectors, biological effect of radiation, radiation hazards.

VI. Practical Medical Physics.**List of References:**

- General Medical Physics- University of Tripoli

BIOSTATISTICS

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Biostatistics	30	...	30	60

Course Objectives:

This course aims to provide medical sciences students with the knowledge and understanding of:

- The methods of statistical analysis, applicable to medical and biological research.
- The course emphasizes concepts and applications of statistical thinking.
- Basic probability theory, estimation, testing hypothesis, ANOVA, preparing for the methods of statistical data analysis, along with other quantitative methods and models.

Syllabus:**Part I:****A. Introduction:**

1. Basic concepts of statistics.
2. The bases of biostatistics.
3. Quantitative and qualitative data.
4. Variables.
5. Computers and biostatistical analysis.

B. The Nature of Data:

1. The scale of measurement.
2. Nominal, ordinal, interval and ratio scale data.

C. Summarizing and representing data:

1. Listing numerical data, tabular presentation (frequency tables, frequency distributions and categorical distributions).
2. Graphical presentation (bar charts, histogram, frequency polygon, Ogive and pie chart).

D. Measures of Central Tendency:

Arithmetic mean, median, mode and weighted mean, relation between mean, median and mode, quintiles and percentiles.

E. Measures of Dispersion:

Range, mean deviation, variance, standard deviation and coefficient of variation.

F. Probability:

1. Rules of probability, objective and subjective.
2. Set theory and set notation.
3. Counting techniques (combination and permutation).
4. Calculating the probability of an event.
5. Discrete and continuous random variables, binomial, Poisson and normal distributions.

Part II:**A. Population and samples:**

1. Concepts of sampling and census.
2. Methods of drawing sample.
3. Simple random sampling (SRS).
4. Estimation of parameters and their standard errors in case of sampling.
5. Sampling distribution and their properties.

B. Estimation:

1. Point estimation and interval estimation.
2. Confidence interval.

C. Test of Hypothesis:

1. Parameters of single and two populations.
2. Association of attributes, contingency tables.
3. Test of independence.
4. Goodness test of fit.

D. Analysis of Variance (ANOVA):

One-way and two-way classifications.

List of References:

- Wayne Daniel, Biostatistics: A Foundation for Analysis in the Health Sciences, John Wiley

ENGLISH LANGUAGE

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
English	30		30	60

Course Objectives:

The aim of the course is to enhance proficiency in English particularly the type of English generally preferred in their specialist subjects, i.e. General Medicine, Dentistry, Pharmacy and Public Health.

Syllabus:**I. Language Components:****A. Grammar:**

1. General revision of the grammatical items studied previously.
2. Grammar in medical discourse.

B. Vocabulary:

1. Structure and analysis (parts of speech, affixation).
2. Medical and scientific terminology.

II. Language Skills:**A. Reading:**

1. Introducing reading skills such as defining, classifying, describing (structure) and cause and effect (process).
2. Using authentic texts from different sources.

B. Techniques:

1. Skimming, scanning, anaphoric reference and comprehension.
2. Making inferences, drawing conclusions, checking facts and giving reasons.
3. Transfer of information (text table, diagram, etc.).
4. Guessing vocabulary from context using contextual clues.

C. Writing:

1. Writing at both the sentence level and paragraph level on topics of general medicine utilizing the theoretical skills introduced in the course.
2. Paragraph structure.
3. Topic sentence, supporting sentences and concluding sentence.

D. Listening and Speaking:

1. Listening to extract main points.
2. Introducing social language related to medical discourse.
3. Class discussion to topics related to medical profession.

III. Medical Terminology.

1. Identify hospital departments, hospital staff, and types of equipment.
2. Describe different parts of the human body
3. Describe first aid steps and steps to maintain hygiene.
4. Identify medical terminologies and basic medical abbreviations.

References:

- Introducing Reading and Writing to Medical Students; Lataiwish, Muftah (2007).
- Introducing English to Medical Students; Imsslam, Nuwara (2007)

ARABIC LANGUAGE

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Arabic Language	30			30

Syllabus:

This course introduces the fundamental elements of the modern standard Arabic language within the cultural context of Arabic-speaking people. Emphasis is placed on the development of advanced Arabic medical terms and Arabic advanced grammar. Upon completion, students should be able to comprehend and respond with grammatical accuracy in spoken and written Arabic and demonstrate cultural awareness.

References:

- Arabic for Medical Students.

FIRST STAGE

FIRST AND SECOND YEARS

- Students passed premedical year successfully, are allowed to register for the first year on first week of September each year.
- Courses of the first stage (first and second years) are; Anatomy, Physiology, Histology, and Biochemistry.

ANATOMY, EMBRYOLOGY AND NEUROANATOMY

The course is designed for undergraduate medical student. It is concerned with the study of normal structure of different parts of the human body with special emphasis on the clinically important points. The development background is presented to give students ability to understand and explain the different congenital anomalies.

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Anatomy and Embryology	100	300	50	450

Course Objectives:

- Providing the students with knowledge concerning the normal structure of the human body at the level of the anatomical regions and organs.
- The study of the normal growth and development relevant to anatomical topics.
- To correlate anatomical facts with their clinical applications.

Practical Objectives:

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

- Identify the different surface markings of internal structures and organs on the living subject.
- Identify the different internal structures in cadavers and preserved specimens.
- Apply the anatomical facts while examining the living subject in order to reach a proper diagnosis.
- Follow appropriate ethical and professional education necessary for dealing with cadavers.

Learning Outcomes:

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

- Describe the surface landmarks of the underlying bones, muscles and tendons, and internal structures (main nerves, vessels and viscera).
- Describe the basic anatomical principles of the structure and relations of the different anatomical regions, organs and systems of the human body.
- Explain the different stages of human development, evolution and growth.
- Outline major clinical applications of anatomical facts.
- Interpret the normal anatomical structures on radiographs and ultrasonography.

Student Assessment Methods:

- Written examination to assess knowledge and understanding.
- Oral examination to assess knowledge and understanding.
- Practical examination to assess 25 specimens' identification.
- Periodical examinations to assess knowledge by sheets examinations held after the dissection of each part including short questions, MCQ and drawings.

SYLLABUS:**GENERAL ANATOMY:**

- I. Definition of Anatomy, history of Anatomy and the importance of Anatomy.
- II. Level of organization.
- III. Methods to study Anatomy.
- IV. Anatomical positions.
- V. Basic anatomical concepts:
 1. **Body planes:** Median, sagittal, paramedian, coronal and transverse.
 2. **Descriptive anatomical terms:**
 - a. Terms related to positions.
 - b. Terms related to movements.
- VI. Basic anatomical structures:
 1. **Skin:** skin types, skin functions, skin appendages (nail, hairs, hair follicles, sebaceous glands, sweat glands), skin lines and skin creases.
 2. **Fasciae:** types, functions.
 3. **Muscles:** types; skeletal, smooth and cardiac muscles.
 - a. Skeletal muscles:
 - b. Parts.
 - c. Morphological classification.
 - d. Classification according to their actions.
 - e. Nerve supply.
 - f. Motor unit, motor fibers.
 - g. Muscle and tendon spindles.
 - h. Simple reflex arc.
 - i. Smooth muscles.
 - j. Cardiac muscles.
 4. **Bones:** types, classification, functions.
 5. **Cartilage:** types, examples for each type.
 6. **Joints:** Definition, types, stabilizing factors
 - a. Synovial joints: structure, types and movements.
 - b. Solid joints: types and examples.
 7. **Ligaments:** types, examples for each type.
 8. **Blood vessels:** Arteries, veins, capillaries.
 9. **Lymphatic tissue:** lymph node, spleen, ...
 10. **Synovial sheaths, bursa.**
 11. **Mucous membranes, serous membranes.**
 12. **Nervous tissue and nervous system.**
 - a. Definition.

- b. Structure.
- c. Anatomical classification.
- d. Physiological classification.
- e. Brain: cerebrum, diencephalon, brain stem.
- f. Spinal cord.
- g. Cranial nerves.
- h. Spinal nerves.
- i. Plexuses: somatic and visceral plexuses.
- j. Dermatomes, myotomes.

13. Autonomic nervous system: sympathetic and parasympathetic.

APPLIED ANATOMY:

I. THE UPPER LIMB:

- 1. **BONES:** clavicle, scapula, humerus, radius, ulna, carpal bones, metacarpal bones and phalanges.
- 2. **PECTORAL REGION:**
 - a. Breast: location and description, blood supply, lymphatic drainage and its clinical importance.
 - b. Muscles: pectoralis major, pectoralis minor and subclavius.
 - c. Clavipectoral fascia.
- 3. **AXILLA:** inlet, walls, contents (brachial plexus, axillary artery, axillary vein, axillary lymph vessels and nodes, axillary process of the breast).
- 4. **BACK MUSCULATURE:**
 - a. Superficial part of the back and scapular region: skin, muscles (*trapezius, latissimus dorsi, levator scapulae, rhomboid minor and rhomboid major*).
 - b. Intermediate group: serratus muscle.
- 5. **ROTATORCUFF MUSCLES:** supraspinatus, infraspinatus, teres minor, subscapularis.
- 6. **ANATOMICAL SPACES:** (Quadrangular, Triangular) boundaries and structures passing through.
- 7. **ARTERIAL ANASTOMOSIS AROUND THE SHOULDER JOINT.**
- 8. **JOINTS:**
 - a. Sternoclavicular joint.
 - b. Acromioclavicular joint.
 - c. Shoulder joint.
 - d. Scapular-humeral mechanism.
- 9. **THE UPPER ARM:**
 - a. Skin.
 - b. Superficial fascia.
 - c. Fascial compartments.
 - d. Contents of anterior fascial compartment:
 - I. Muscles.
 - II. Nerves.
 - III. Blood vessels.
 - IV. Structures passing through anterior fascial compartment.
 - e. Contents of posterior fascial compartment.
 - f. Structures passing through posterior fascial compartment.
 - g. Cubital fossa: boundaries and contents.

10. THE FOREARM:

- a. Skin.
- b. Superficial fascia.
- c. Fascial compartments:
 - I. Contents of anterior fascial compartment
 - II. Contents of lateral fascial compartment
 - III. Contents of posterior fascial compartment
- d. Interosseous membrane.
- e. Flexor retinaculum.
- f. Extensor retinaculum

11. THE WRIST REGION: structures anterior to the wrist and structures posterior to the wrist.**12. THE HAND:**

First: the palm of the hand:

- a. Skin.
- b. Deep fascia.
- c. Palmar aponeurosis.
- d. Carpal tunnel.
- e. Fibrous flexor sheaths.
- f. Synovial flexor sheaths.
- g. Insertion of the long flexor tendons.
- h. Small muscles of the hand, including that of the thumb and little finger.
- i. Fascial spaces of the palm.
- j. Pulp spaces of the fingers.

Second: dorsal aspect of the hand:

- a. Skin.
- b. Superficial fascia.
- c. Insertion of long extensor tendons.

13. JOINTS OF THE UPPER LIMB: articulation, type, capsule, ligaments, synovial membrane, bursa related, movements and muscles doing the movements.

- a. Sternoclavicular joint.
- b. Acromioclavicular joint.
- c. Shoulder joint-Scapular-Humeral mechanism.
- d. Elbow joint.
- e. Proximal radioulnar joint.
- f. Distal radioulnar joint.
- g. Wrist joint.
- h. Intercarpal joint.
- i. Carpometacarpal joint.
- j. Metacarpophalangeal joint.
- k. Interphalangeal joint.

14. NERVES OF THE UPPER LIMB:

- a. Brachial plexus: formation, parts, branches and effects of injury of main branches.
- b. Radial nerve: course, main relations, branches, levels of its injury and related clinical pictures.
- c. Median nerve: course, main relations, branches, levels of its injury and related

clinical pictures.

- d. Ulnar nerve: course, main relations, branches, levels of its injury and related clinical pictures.
- e. Other branches of the brachial plexus of clinical importance (long thoracic nerve, musculocutaneous nerve and axillary nerve).
- f. Cutaneous nerve supply of the upper limb particularly the hand.

15. BLOOD SUPPLY OF THE UPPER LIMB:

- a. Arteries: (beginning, end, branches, main relations and surface anatomy) they are:
 - I. Axillary artery.
 - II. Brachial artery.
 - III. Radial artery.
 - IV. Ulnar artery.
 - V. Anterior carpal arch.
 - VI. Posterior carpal arch.
 - VII. Superficial palmar arch.
 - VIII. Deep palmar arch.
- b. Veins: (beginning, end, branches, main relations and surface anatomy) they are:
 - I. Dorsal venous arch.
 - II. Basilica vein.
 - III. Axillary vein.
 - IV. Cephalic vein.
 - V. Median cubital vein.

16. THE HAND AS A FUNCTIONAL UNIT:

- I. Position of the hand.
- II. Movements of the thumb.
- III. Movements of the index, middle, ring and little fingers.
- IV. Cupping of the hand.
- V. Making a fist.
- VI. Hand as a mechanical and sensory tool.

II. THORAX:

A. PART I: THE THORACIC WALLS:

- 1. **Definition of the thorax.**
- 2. **Openings of the thorax:** thoracic outlet, thoracic inlet.
- 3. **Structure of thoracic wall:** sternum, costal cartilages and ribs.
- 4. **Joints of the ribs and costal cartilages.**
- 5. **Joints of the sternum.**
- 6. **Intercostal spaces:**
 - a. Intercostal muscles: external, internal and innermost.
 - b. Intercostal arteries.
 - c. Intercostal veins.
 - d. Intercostal nerves.
- 7. **Internal thoracic artery and vein.**
- 8. **Suprapleural membrane.**
- 9. **Endothoracic fascia.**

B. PART II: THE THORACIC CAVITY:

1. **Trachea (thoracic part):** length, main relations, blood supply, nerve supply and lymph drainage.
2. **Pleurae:** (parietal and visceral pleurae), differences, nerve supply.
3. **Lungs:** morphology, lobes and fissures, mediastinal relations, bronchopulmonary segments, blood supply, lymph and nerve supply.
4. **Mediastinum:** definition, divisions (superior, inferior, anterior, middle and posterior), boundaries and contents of each division.
5. **Pericardium:** types: fibrous, serous (parietal and visceral) and nerve supply.
6. **Pericardial sinuses:** oblique and transverse.
7. **Heart:**
 - a. Surfaces, borders, chambers (right atrium, right ventricle, left atrium and left ventricle).
 - b. Structure and conducting system.
 - c. Arterial supply (right and left coronary arteries).
 - d. Venous drainage: coronary sinus...
 - e. Nerve supply.
 - f. Surface anatomy of the heart valves (tricuspid, mitral, pulmonary and aortic).
8. **Large veins of the thorax:**
 - a. Brachiocephalic veins.
 - b. Superior vena cava.
 - c. Azygos veins (azygos, superior hemiazygos and inferior hemiazygos).
 - d. Inferior vena cava.
 - e. Pulmonary veins.
9. **Large arteries of the thorax:**
 - a. Aorta (ascending aorta, arch of the aorta and descending thoracic aorta).
 - b. Pulmonary trunk (right and left pulmonary arteries).
10. **Lymph nodes and vessels of the thorax:** thoracic wall, mediastinum, thoracic duct and right lymphatic trunk.
11. **Nerves of the thorax:**
 - a. Vagus nerves.
 - b. Phrenic nerves.
 - c. Thoracic part of sympathetic trunk.
12. **Esophagus (thoracic part):** length, main relations, blood supply, lymph drainage and nerve supply.
13. **Thymus:** site and blood supply.

III. ABDOMEN:**A. PART I: ANTERIOR ABDOMINAL WALLS:**

1. **Structure of anterior abdominal wall:**
 - a. Skin.
 - b. Superficial fascia.
 - c. Deep fascia.
 - d. Muscles (external oblique, internal oblique, transversus abdominis, rectus abdominis and pyramidalis).
2. **Rectus sheath:** walls and contents.
 - a. Nerve supply and dermatomes of anterior abdominal wall.
 - b. Arterial supply.

- c. Venous drainage.
- d. Lymphatic drainage.
- 3. **Inguinal canal:** superficial and deep inguinal rings, walls, contents and clinical importance of inguinal canal (inguinal hernia).
- 4. **Spermatic cord:** definition, coverings and structures.
- 5. **External genitalia of the male.**
- 6. **Scrotum:** definition, layers, contents, nerve and blood supply, lymphatic drainage and cremasteric reflex.
- 7. **Testis:** definition and structure.
- 8. **Epididymis:** parts, length and function, blood supply of testis and epididymis, lymph drainage of testis and epididymis.
- 9. **Clinical conditions of scrotum and testis:** varicocele, hydrocele...
- 10. **Structure of the posterior abdominal wall:** lumbar vertebrae: number, types 12th pair of ribs ilium.
- 11. **Muscles of posterior abdominal wall:** psoas major, quadratus lumborum and iliacus.
- 12. **Fascial lining of the abdominal walls.**
- 13. **Peritoneal lining of the abdominal walls.**
- 14. **Clinical anatomy:** hernia, abdominal stab wounds, surgical incisions and paracenteses of the abdomen.
- 15. **Abdominal lines and planes.**
- B. **PART II: THE ABDOMINAL CAVITY:**
 - 1. **General arrangement of abdominal viscera:** liver, gall bladder, esophagus, stomach, small intestine, large intestine, pancreas, spleen, kidneys and suprarenal glands.
 - 2. **Peritoneum:** general arrangement, intraperitoneal and retroperitoneal relationships, peritoneal ligaments, omenta and mesenteries, peritoneum as seen on transverse and sagittal sections of the abdomen, peritoneal pouches, recesses, spaces and gutters, nerve supply of the peritoneum, function of the peritoneum and clinical importance (ascites).
 - 3. **Gastrointestinal tract:**
 - a. Esophagus (abdominal part).
 - b. Stomach.
 - c. Small intestine: duodenum, jejunum and ilium.
 - d. Large intestine: cecum, appendix, ascending colon, transverse colon and descending colon.
Location, relations, peritoneal coverings and ligaments, nerve and blood supply, lymph drainage for each part, differences between jejunum and ilium and differences between small and large intestine.
 - 4. **Accessory organs of the gastrointestinal tract:**
 - a. Liver: location and description, important relations, blood supply, lymph drainage and nerve supply.
 - b. Bile ducts of the liver.
 - c. Hepatic ducts, bile duct, gall bladder (location and description, important relations, blood supply, lymph drainage and nerve supply).
 - d. Cystic duct.
 - e. Pancreas: location and description, important relations, pancreatic duct, blood supply, lymph drainage and nerve supply.
 - f. Spleen: location and description, important relations, blood supply, lymph drainage and nerve supply.

5. Retroperitoneal space:

- a. Urinary tract:
 - b. Kidneys: location and description, coverings, renal structure, important relations, blood supply, lymph drainage and nerve supply.
 - c. Ureter: location and description, important relations, blood supply, lymph drainage and nerve supply.
 - d. Suprarenal gland: location and description, important relations, blood supply, nerve supply and lymph drainage.
 - e. Arteries on the posterior abdominal wall:
Aorta: location and description, branches (common iliac artery, external iliac artery and internal iliac artery).
 - f. Veins on the posterior abdominal wall:
Inferior vena cava: location and description, tributaries (inferior mesenteric vein, splenic vein, superior mesenteric vein and portal vein).
 - g. Lymphatic on the posterior abdominal wall:
Lymph nodes (preaortic lymph nodes and lateral aortic lymph nodes) and lymph vessels.
- 6. Thoracic duct.**
- 7. Nerves on the posterior abdominal wall:** lumbar plexus, sympathetic trunk (abdominal part) and aortic plexuses.

IV. PELVIS AND PERINEUM:**PART I: THE PELVIC WALLS:**

1. **The pelvis:** orientation of the pelvis, false pelvis, true pelvis.
2. **Structure of the pelvic walls:**
 - a. Anterior pelvic wall.
 - b. Posterior pelvic wall: sacrum, coccyx and piriformis muscle.
 - c. Lateral pelvic wall: hip bone, obturator membrane, Sacro tuberos ligament, sacrospinous ligament and obturator internus muscle.
 - d. Internal pelvic wall (pelvic floor).
 - e. Pelvic diaphragm: levator ani and coccygeus muscles.
3. **Pelvic fascia:** parietal and visceral pelvic fascia.
4. **Pelvic peritoneum.**
5. **Nerves of the pelvis:**
 - a. Sacral plexus: branches.
 - b. Obturator nerve.
 - c. Autonomic nerves: pelvic part of sympathetic trunk, pelvic splanchnic nerves, superior hypogastric plexus and inferior hypogastric plexus.
6. **Arteries of the pelvis:**
 - a. Common iliac and external iliac arteries.
 - b. Arteries of the true pelvis.
 - c. Internal iliac artery.
 - d. Ovarian and median sacral arteries.
7. **Veins of the pelvis:** external iliac, internal iliac and median sacral veins.
8. **Lymphatic of the pelvis.**
9. **Joints of the pelvis:**
 - a. Sacroiliac joint.

- b. Symphysis pubis.
- c. Sacrococcygeal joint.

10. Sex differences of the pelvis.

11. Types of female pelvis.

PART II: THE PELVIC CAVITY:

1. Contents of the pelvic cavity:

- a. Sigmoid colon: location and description, important relations, blood supply, lymph drainage and nerve supply.
- b. Rectum: location and description, important relations, blood supply, lymph drainage and nerve supply.

2. Pelvic viscera in the male:

- a. Ureters (pelvic part): course and constrictions.
- b. Urinary bladder: location and description, important relations, blood supply, lymph drainage and nerve supply.

3. Male genital organs:

- a. Vas deferens (pelvic part): course, end and length.
- b. Seminal vesicles: blood supply, lymph drainage and function.
- c. Ejaculatory ducts: length, end and function.
- d. Prostate: location and description, important relations, blood supply, lymph drainage and nerve supply.
- e. Prostatic urethra: length and features.
- f. Visceral pelvic fascia.
- g. Peritoneum.

4. Pelvic viscera in the female:

- a. Ureters (pelvic part): course, constrictions and blood supply.
- b. Urinary bladder: location and description, important relations, blood supply, lymph drainage and nerve supply.

5. Female genital organs:

- a. Ovary: location and description, important relations, function, blood supply, lymph drainage and nerve supply.
- b. Uterine tube: location and description, important relations, function, blood supply, lymph drainage and nerve supply.
- c. Uterus: location and description, structure, function, position and important relations, blood supply, lymph drainage and nerve supply support of the uterus and prolapse.
- d. Vagina: location and description, important relations, function, blood supply, lymph drainage and nerve supply, support of the vagina and prolapse.
- e. Visceral pelvic fascia.
- f. Peritoneum.

6. Broad ligament: parts and contents.

PART III: THE PERINEUM:

1. Contents of anal triangle:

- a. Anal canal: location and description, structure, important relations, blood supply, lymph drainage and nerve supply.
- b. Ischiorectal fossa: boundaries, contents and abscess.
- c. Pudendal nerve: course and branches.
- d. Internal pudendal artery: course and branches.

- e. Internal pudendal vein: tributaries.
- 2. Urogenital triangle:**
 - a. Superficial fascia.
 - b. Superficial perineal pouch: boundaries and contents (male and female), bulbospongiosus, ischiocavernosus and superficial transverse perineal muscles.
 - c. Perineal branch of pudendal nerve: branches.
 - d. Penis (clitoris): root, body, blood supply, lymph drainage and nerve supply.
 - e. Deep perineal pouch: boundaries and contents (male and female).
- 3. Contents of deep perineal pouch in male:**
 - a. Membranous part of urethra.
 - b. Sphincter urethrae muscle.
 - c. Bulbourethral glands.
 - d. Deep transverse perineal muscle.
 - e. Internal pudendal vessels.
 - f. Dorsal nerve of the penis.
- 4. Contents of deep perineal pouch in female:**
 - a. Urethra.
 - b. Vagina.
 - c. Sphincter urethrae muscle.
 - d. Deep transverse perineal muscle.
 - e. Internal pudendal vessels.
 - f. Dorsal nerve of the clitoris.

PART IV: Back:

- 1. Vertebral Column:
 - General Characteristics.
 - Typical Vertebra.
 - Intervertebral Disks.
 - Regional Characteristics of Vertebrae.
 - Ligaments of the Vertebral Column.
- 2. Soft Tissues of the Back:
 - Superficial Tissues
 - Deep Tissues
- 3. Spinal Cord and Associated Structures:
 - Spinal Cord
 - Spinal Nerves
 - Structures Associated with the Spinal Cord
 - Dermatome, Myotome, and Sclerotome
 - Development of Back Structures

v. THE LOWER LIMB:

- 1. Organization of the lower limb.**
- 2. Bones:** hip bone, femur, patella, tibia, fibula, tarsal, metatarsal and phalanges bones.
- 3. The gluteal region:**
 - Skin.

- Fascia (superficial and deep).
 - Ligaments: Sacro tuberos and sacrospinous.
 - Foramina: greater and lesser sciatic.
 - Muscles: glutei.
 - Nerves: sciatic nerve, posterior cutaneous nerve of the thigh, superior gluteal nerve.
 - Arteries: superior gluteal and inferior gluteal arteries.
 - Trochanteric anastomosis.
 - Cruciate anastomosis.
- 4. Frontal and medial aspect of the thigh:**
- Skin.
 - Superficial fascia.
 - Deep fascia (fascia lata, iliotibial tract).
- 5. Fascial compartments of the thigh:**
- Contents of the anterior fascial compartments of the thigh: muscles, blood supply and nerve supply.
 - Femoral sheath: boundaries, compartments, contents and applied anatomy (femoral hernia).
 - Femoral triangle: boundaries and contents.
 - Adductor canal: boundaries and contents.
 - Contents of the medial fascial compartments of the thigh: muscles, blood supply and nerve supply.
 - The back of the thigh: skin, cutaneous nerves, superficial veins and lymph vessels.
 - Contents of the posterior fascial compartments of the thigh: muscles, blood supply and nerve supply.
- 6. Hip joint:** articulation, type, capsule, ligaments, synovial membrane, bursa related, main relations, movements and muscles doing the movements.
- 7. Popliteal fossa:** boundaries and contents.
- 8. Arterial anastomosis around the knee joint.**
- 9. Fascial compartments of the leg:**
- The front of the leg: skin, cutaneous nerves, superficial veins and lymph vessels.
 - Contents of the anterior fascial compartments of the leg: muscles, blood supply and nerve supply.
 - Contents of the lateral fascial compartments of the leg: muscles, blood supply and nerve supply.
 - The back of the leg: skin, cutaneous nerves, superficial veins and lymph vessels.
 - Contents of the posterior fascial compartments of the thigh: muscles (superficial and deep), blood supply and nerve supply.
 - Interosseous membrane.
 - Retinacula of the ankle.
- 10. The region of the ankle:**
- Anterior aspect of the ankle:
 - Structures that pass anterior to the extensor retinacula.
 - Structures that pass beneath or through the extensor retinacula.
 - Posterior aspect of the ankle:
 - Structures that pass behind the medial malleolus beneath the flexor retinaculum.
 - Structures that pass behind the lateral malleolus superficial to the

superior peroneal retinaculum.

- Structures that pass behind the lateral malleolus beneath the superior peroneal retinaculum.

11. The foot:

a. The sole of the foot:

- I. Skin: deep fascia and planter aponeurosis.
- II. Muscles: 4 layers.
- III. Long tendons:
 2. Fibrous flexor sheaths.
 3. Synovial flexor sheaths.
- IV. Arteries: medial and lateral plantar.
- V. Veins: medial and lateral plantar.
- VI. Nerves: medial and lateral plantar.

b. The dorsum of the foot:

- I. Skin: sensory nerve supply, dorsal venous arch.
- II. Muscles: extensor digitorum brevis, insertion of long extensor tendons.
- III. Arteries: dorsalis pedis.

12. Joints of the lower limb:

- Knee joint.
- Proximal tibiofibular joint.
- Distal tibiofibular joint.
- Ankle joint.
- Tarsal joint.
- Tarsometatarsal joint.
- Metatarsophalangeal joint.
- Interphalangeal joint.

(Articulation, type, capsule, ligaments, synovial membrane, bursa related, main relations, movements and muscles doing the movements).

13. Venous drainage of the lower limb:

- Superficial: great and small saphenous veins, dorsal venous arch.
- Deep: femoral and popliteal veins.

(Beginning, end, tributaries and course).

14. Arterial supply of the lower limb:

- Femoral artery.
- Obturator artery.
- Anterior tibial artery.
- Posterior tibial artery.
- Medial plantar artery.
- Lateral plantar artery.
- Peroneal artery.
- Dorsalis pedis artery.
- Superior gluteal artery.
- Inferior gluteal artery.

(Beginning, end, branches and main relations).

15. Nerve supply of the lower limb:

- Sciatic nerve.
- Tibial nerve.

- Common peroneal nerve.
- Femoral nerve.
- Obturator nerve.
- Medial plantar nerve.
- Lateral plantar nerve.
- Superior gluteal nerve.
- Inferior gluteal nerve.
- Posterior cutaneous nerve of the thigh.
(Origin, branches and main relations).

16. Lymphatic drainage (vessels and nodes): inguinal and popliteal lymph nodes.

17. Arches of foot:

- Medial longitudinal arch.
- Lateral longitudinal arch.
- Transverse arch.

Formation and applied anatomy (flat foot).

VI. NEUROANATOMY:

a. Overview of the human nervous system:

- i. Physical basis of every aspect of human behavior and experience.
- ii. Functional capacity.
- iii. Neurons.
- iv. Neuroglia.
- v. Nerve Fibers.
- vi. Peripheral Nerves
- vii. Receptor and Effector Endings
- viii. Dermatomes, and Muscle Activity

b. Divisions of CNS.

c. Divisions of PNS.

d. Somatic, autonomic and enteric nervous system.

e. Development of the nervous system: neural tube, folding, layers, neural crest, flexures, ...

f. Prosencephalization.

g. Rhombic lip.

h. Anomalies of the nervous system.

i. Protection of CNS:

- i. Bony.
- ii. Meningeal.
- iii. Fluid (CSF).

j. Dura matter folds and dural sinuses.

k. Subarachnoid cisterns.

l. Cerebrospinal fluid: formation, circulation and absorption.

m. Blood brain barrier.

n. Blood supply of the brain: arterial supply and venous drainage.

o. Spinal cord: external features and internal organization: grey matter, white matter and tracts.

p. Brain stem:

- i. Medulla oblongata:

1. Gross external features and attachment of cranial nerves.
2. Internal features: motor crossing, sensory crossing and open medulla.
- ii. Pons:
 1. External features and attachment of cranial nerves.
 2. Internal features: a level of facial colliculus, upper part of pons.
- iii. Midbrain:
 1. External features and attachment of cranial nerves.
 2. Internal features: inferior collicular level and superior collicular level.
- q. Cerebellum:**
 - i. Evolution.
 - ii. Anatomical lobes.
 - iii. Functional lobes.
 - iv. Cerebellar peduncles and their constituents.
 - v. Intracerebellar nuclei.
 - vi. Cerebellar function.
 - vii. Cerebellar ataxia.
- r. 4th ventricle:** connection, boundaries, choroid plexus and opening.
- s. Diencephalon.**
- t. Thalamus:** nuclei, connections and function.
- u. Hypothalamus:** nuclei and function.
- v. Metathalamus:** LGB, MGB.
- w. Epithalamus:** pineal gland.
- x. Cerebral hemispheres:**
 - i. Gross features: poles, borders, surfaces, lobes, gyri, sulci and functional areas.
 - ii. White matter: associations commissural, corpus callosum (parts, fibers and blood supply), projections and internal capsule (parts, fibers and blood supply).
- y. Basal ganglia:** quadrate nucleus, lentiform nucleus (globus pallidus and putamen), amygdaloid body and functional aspects of basal ganglia.
- z. Third and lateral ventricles:** boundaries and features.
- a. Visual pathway.**
- b. Limbic system.**
- c. Cerebral topography:** PET, cerebral imaging and SPECT.

VII. HEAD AND NECK:

- a. Bones: skull, mandible and cervical vertebrae.**
- b. The head:**
 - i. Scalp: layers, nerve supply, arterial supply, venous drainage and lymphatic drainage.
 - ii. Face: muscles (buccinators, orbicularis oculi, orbicularis oris), nerve supply, arterial supply, venous drainage and lymphatic drainage.
 - iii. Temporal and infratemporal fossa: boundaries, muscles of mastication, mandibular nerve, maxillary artery, pterygoid plexus of veins, optic ganglion and sphenopalatine ganglion.
 - iv. Parotid gland.
 - v. Cranial cavity: meninges, dural venous sinuses and pituitary gland.
 - vi. Orbit: eye lid, lacrimal apparatus, extra-ocular muscles, nerves and vessels of

the orbit, ciliary ganglion and orbital fascia.

c. The neck:

- i. Fascia (superficial and deep).
- ii. Triangles of the neck (divisions), sternomastoid muscle.
- iii. Posterior triangle (boundaries and contents) and suboccipital triangle (boundaries and contents).
- iv. Submandibular region (submandibular gland, digastric muscle, mylohyoid muscle, hyoglossus muscle, geniohyoid muscle, lingual nerve, hypoglossal nerve, submandibular ganglion and sublingual gland).
- v. Muscular triangle: infrahyoid muscles and ansa cervicalis.
- vi. Thyroid gland and parathyroid glands.
- vii. Scalene muscles.
- viii. Big arteries in the neck: subclavian and carotid system (common carotid, external carotid and internal carotid).
- ix. Veins in the neck: subclavian, internal jugular and external jugular veins.
- x. Nerves in the neck: cranial nerves, cervical plexus and cervical sympathetic chain.
- xi. Nasal cavity (walls, nerve supply, blood supply and lymphatic drainage) and paranasal sinuses (names and drainage).
- xii. Oral cavity: teeth, tongue and palate (soft and hard).
- xiii. Pharynx: walls, muscles, cavity, nerve supply, blood supply and lymphatic drainage.
- xiv. Larynx: structure, cavity, nerve supply, blood supply and lymphatic drainage.
- xv. Cervical part of trachea and esophagus.
- xvi. Ear: external, middle and inner.
- xvii. Joints: temporo-mandibular, atlanto-axial and atlanto-occipital joints.
- xviii. Lymphatics of the head and neck.

MACROSCOPIC ANATOMY.

CLINICAL AND TOPOGRAPHIC ANATOMY.

Laboratory hours will be used to examine models, cadavers and preserved specimens, films and slide to understand the concept of lectures

EMBRYOLOGY

GENERAL EMBRYOLOGY:

- **INTRODUCTION:**
 1. Definition of embryology
 2. Terms (embryo, fetus, teratology, oogenesis, morphogenesis, organizer and malformation).
- **GENITAL SYSTEMS:** male and female.
- **GAMETOGENESIS:** spermatogenesis and oogenesis.
- **REPRODUCTIVE CYCLES:**
 1. Ovarian cycle (phases and hormonal control).

2. Uterine cycle (phases).
- **FERTILIZATION:**
 1. The meaning of fertilization.
 2. Site of fertilization.
 3. Transport of ovum.
 4. Transport of sperm (capacitation and acrosomal reaction).
 5. Result of fertilization.
 6. In-vitro fertilization.
 7. Cloning.
- **CLEAVAGE:**
 1. Definition of cleavage.
 2. Stages: 2cell, 4cell 16 cell stage and morula.
 3. Significance of zona pellucida.
 4. Blastocyst formation:
 - a. Outer cell mass (trophoblasts).
 - b. Inner cell mass (embryoblast).
- **IMPLANTATION:**
 1. Definition.
 2. Steps of implantation.
 3. Site of implantation:
 - a. Normal site.
 - b. Abdominal site: in the uterus and outside the uterus (ectopic pregnancy).
- **DECIDUA:** definition, cause of formation and parts decidua.
- **BILAMINAR EMBRYO (the second week):**
 1. Development of the trophoblast.
 2. Development of the inner cell mass.
 3. Chorion formation.
 4. Primitive streak.
 5. Development of the notochord.
 6. Development of the neural tube.
- **TRILAMINAR EMBRYO (the third week):**
 1. Development of the intraembryonic mesoderm (secondary mesoderm).
 2. Sources of secondary mesoderm and site.
 3. Differentiation of secondary mesoderm:
 - a. Paraxial plate.
 - b. Internal plate.
 - c. Lateral plate.
 4. Derivative of each plate.
- **FOLDING.**
- **DERIVATIVES OF THE GERM LAYERS:** ectoderm, endoderm and mesoderm.
- **FETAL MEMBRANES:**
 1. Amnion: the normal development and the anomalies.
 2. Yolk sac: the normal development and the anomalies.
 3. Allantois: the normal development and the anomalies.
 4. Umbilical cord: the normal development and the anomalies.
 5. Placenta: the normal development and the anomalies.

- **MULTIPLE PREGNANCIES.**
- **LIFE SPAN.**
- **CONGENITAL MALFORMATION (causes).**

SPECIAL EMBRYOLOGY:

- **DEVELOPMENT OF THE UROGENITAL SYSTEM:**
 - Pronephros.
 - Mesonephros.
 - Metanephros.
 - 1. Development of urinary bladder.
 - 2. Development of urethra.
- **DEVELOPMENT OF THE GENITAL SYSTEM:**
 1. Development of Inguinal Canals
 2. Development of the testis.
 3. Development of the ovary.
 4. Genital ducts:
 - a. The mesonephric ducts (Wolffian), fate in the male and in the female.
 - b. The paramesonephric ducts (Mullerian), fate in the male and in the female.
 5. Development of the vagina.
 6. Development of the external genitalia.
- **DEVELOPMENT OF THE CARDIOVASCULAR SYSTEM:**
 1. Development of the heart:
 - a. Sinus venosus.
 - b. Development of the 2 atria.
 - c. Development of interatrial septum.
 - d. Development of bulbus cordis (bulbo-ventricular region).
 - e. Development of truncus arteriosus.
 - f. Anomalies of the heart.
 2. Development of the arteries:
 - a. Fate of the aortic sac.
 - b. Fate of the aortic arches.
 - c. Fate of the two dorsal aortae.
 - d. Development of the arteries of the limbs (upper and lower limbs).
 3. Development of the veins:
 - a. Vitelline veins.
 - b. Umbilical veins.
 - c. Cardinal veins.
 - d. The inferior vena cava.
 4. Fetal circulation-changes just after birth.
- **DEVELOPMENT OF THE RESPIRATORY SYSTEM:**
 - Development of Larynx and Trachea
 - Development OF Lungs and Bronchi
- **DEVELOPMENT OF THE DIGESTIVE SYSTEM:**

- Derivatives of the fore-gut.
- Derivatives of the mid-gut.
- Derivatives of the hind-gut.
- 1. Development of the (stomach, duodenum, liver, gall bladder, pancreas and spleen).
- 2. Development and anomalies of the mid-gut.
- 3. Development and anomalies of the hind-gut.
- 4. Pharyngeal arches, pharyngeal clefts and pharyngeal pouches.
- 5. Development of the tongue.
- **DEVELOPMENT OF ENDOCRINE GLANDES:** thyroid, pituitary, suprarenal and salivary glands.
- **DEVELOPMENT OF THE BODY CAVITIES.**
- **DEVELOPMENT OF THE DIAPHRAM.**
- **DEVELOPMENT OF THE FACE, NOSE AND PALATE.**
- **DEVELOPMENT OF THE EYE AND EAR.**
- **DEVELOPMENT OF INTEGUMENTARY SYSTEM:** skin, nails, mammary gland and hairs.
- **DEVELOPMENT OF VERTEBRAL COLUMN.**
- **DEVELOPMENT OF THE LIMBS.**
- **DEVELOPMENT OF THE BRAIN AND SPINAL CORD.**
- **TERATOLOGY:** etiology and congenital malformation.

REFERENCES:

I. Essential Books:

- Snell, R.S., Clinical Anatomy by Regions, 8th edition, Lippincott, Williams and Wilkins, 2008.
- Sadler, TW; Langman's Medical Embryology; 10th edition; Lippincott Williams & Wilkins, 2006.
- Snell, R.S., Clinical Neuroanatomy for Medical Students, 6th edition, Lippincott, Williams and Wilkins, 2005.

II. Recommended Books:

- Drake, R.L., Vogl, W. Mitchell, A.W.M., Gray's Anatomy for Students, Churchill Livingstone, 2004.
- Moore, K.L. and A.F. Dalley, Clinically Oriented Anatomy, 5th edition, Lippincott, Williams & Wilkins, 2006.
- Tank, P.W., Grant's Dissector, 14th edition, Lippincott, Williams and Wilkins, 2008.
- Agur, A.M.R. and Dalley, A.F. Grant's Atlas of Anatomy, 11th edition, Lippincott, Williams & Wilkins, 2004.
- Keith Moore, L and Persaud, TVN; The Developing Human: Clinically Oriented Embryology. 7th edition; Saunders, 2002.

HISTOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Histology and Genetics	50	100	50	200

Course Objectives:

- Providing the students with knowledge concerning the basic histological structure and ultrastructure of the cell with correlation to biological cellular activities, and basis of cytogenetic.
- Teaching the students the normal histological structure of different tissues of human body in addition to some of its systems, and how to identify them under the microscope, with functional and clinical correlation whenever possible.
- To enable students to know the histological structure of various organs and systems of the body and to correlate between the structure and function with relevant clinical notes whenever possible.

Practical Objectives:

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

- Name the instruments and techniques used to prepare and study histological specimens.
- Use the microscope efficiently.
- Handle the histological glass slides and examine them using the microscope.
- Recognize different cellular and intracellular components in electron photomicrographs.
- Recognize and differentiate between types of cells and tissues in histological slides.
- Draw and label the structures they have seen in electron photomicrographs.
- Recognize and differentiate between different organs in histological slides seen under the microscope.
- Identify the structural features and different tissue elements of each organ under the microscope.
- Draw and label histological slides seen during the course.

Learning Outcomes:

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

- Know the basic steps in preparing specimens for light and electron microscopy.
- Define and describe the structure and functions of the cytoplasmic components.
- Know the subunits of each nuclear component and their role in its function.
- Explain the process of cell division and identify the activities that control the transition from each phase of the cell cycle to the other.
- Understand the basis of cytogenetic and chromosomal aberrations.
- Know the structural characteristics of the four basic tissue types.
- Describe the functional capabilities of each tissue type and relate them to the structure.
- Describe and compare between different blood elements and their development.
- Define and discuss the basic histological structure of some systems (vascular, lymphatic, and skin).
- Describe the normal histological structure of various body systems.
- Know the distinguishing structural features of organs, regions and cell types present in each system and relate the structural variations to differences in organ function.

- Correlate between histological structure and function of different organs of all studied systems.
- Understand the relation between the endocrine system and other systems, especially the male and female reproductive systems.
- Have an integrated knowledge regarding histological structure, anatomy and physiology.

Student Assessment Methods:

- Written examination to assess knowledge and understanding and intellectual skills.
- Oral examination to assess knowledge and understanding, attitude and general skills.
- Practical examination to assess practical skills in diagnosis of different tissues under the microscope.
- Practical notebook to assess attendance and evaluation of understanding and drawing skills of histological sections.

SYLLABUS:**I. Micro techniques:**

- Methods of studying living cells and tissues.
- Preparation of tissues for microscopic examination.
- Chemical basis of staining.
- Radioautography and cell fractionation techniques.
- Histochemistry and cytochemistry.
- Problems in interpretation of tissue sections.
- Microscopy and types of microscopes.

Practical:

- Light microscope;
- Parts.
- Handling.
- Care.
- Demonstration of;
- Paraffin embedding.
- Section cutting & staining.
- Staining of teased material.
- Appearance of diff. structures in diff. sectional plane.

II. The Cell:

- Cell structure and function.
- Cell organelles and inclusions.
- Nucleus structure and function.
- The cytoskeleton.
- Cell inclusions.
- Nucleus.
- Mitosis & cell cycle.
- Meiosis.

Practical:

- Light microscopic demonstration of;
- Microvilli.

- Cilia.
- RER & SER.
- Inclusions.
- Electron photomicrographs.

III. Cytogenetics:

- Cell cycle.
- Cell divisions and their anomalies.
- Chromosomes and their structural and numerical anomalies.

IV. Epithelial Tissues:

- General characteristics.
- Specializations of cell surfaces.
- Basement membrane and basal lamina.
- Classification of Epithelia.
- Glandular epithelium.
- Types of covering epithelium.
- Surface modification:
- Microvilli, Cilia, Stereocilia and Flagella.
- Cell functions.
- Ultrastructure & function of main types of epithelial cells.

Practical:

- Simple epithelia.
- Stratified epithelia.
- Glandular epithelia.

V. Connective Tissues:

- Components of the connective tissue.
- Classification of connective tissues: embryonic, proper, and specialized
- Connective tissues.
- Adipose tissues; unilocular and multilocular.
- Fibers.
- Inflammatory cells.

Practical

- Tendon.
- Ligamentum nuchae.
- Reticular conn. Tissue (in spleen, lymph node, Kidney, Liver).
- Loose areolar connective tissue, mucoid connective tissue.

VI. Cartilage:

- Cells.
- Ground substance.
- Types of cartilage; hyaline, elastic, fibrocartilage.
- Intervertebral disks.

Practical:

- Hyaline cartilage e.g. trachea & costal cart.
- Elastic cartilage in ear pinna.
- Fibrocartilage, intervertebral disc.

VII. Bone:

- Bone Cells.
- Matrix.
- Periosteum and endosteum.
- Types of bone: compact & spongy bone.
- Growth and remodeling of the bone.
- Fracture repair.
- Joints.
- Ossification: intracartilagenous, intramembranous.

Practical:

- Compact bone.
- Spongy bone.
- Growing bone.

VIII. Muscular Tissues:

- Types of muscular tissue.
- Ultrastructure of muscle fibers in relation function.
- Neuromuscular junction.
- Regeneration muscular tissue.
- Cardiac muscle.

Practical:

- Skeletal muscle (LS & TS).
- Motor end plate.
- Smooth muscle (GIT).
- Cardiac muscle moderator band.

IX. Nervous Tissue:

- Neurons: types, structure, and function.
- Synapses.
- Neuroglial cells & myelination.
- Central nervous system: cerebrum, cerebellum, and spinal cord.
- Meninges, Choroid Plexus, Cerebrospinal Fluid.
- Peripheral nervous system: nerve fibers, ganglia, and autonomic nervous system.
- Degeneration and regeneration of the nervous tissue.
- Autonomic nervous system and ganglia.
- Spinal cord.
- Cerebrum, cerebellum, meninges & choroid plexus.

Practical:

- Types of neurons.
- Neuralgia.
- Section of sp. Cord cerebellum.
- Cerebellum.

X. Blood:

- General, cells, plasma common stain used.
- Erythrocytes.
- Granulocytes.
- Agranulocytes & platelets.

- Bone marrow & erythropoiesis.
- Leukopoiesis & thrombopoiesis.

Practical:

- Making blood film.
- Differential leucocytes Count.
- Bone marrow.
- Hemocytometry (RBCs & WBCs count).

XI. Cardiovascular System:

- General structure of blood vessels.
- Types of blood vessels; arteries, veins, and capillaries.
- Microcirculation.
- Lymphatic vessels.
- Heart structure and autonomic conducting system.

Practical:

- Elastic artery.
- Muscular artery.
- Arterioles & venules.
- Medium sized vein.
- Large vein.
- Capillaries.
- Umbilical & Coronary veins.

XII. Lymphatic System:

- Lymphoid Tissue.
- Thymus.
- Lymph Nodes.
- Spleen.
- Tonsils.
- Reticuloendothelial system.
- Immune system, develop, overview, types of immune.

Practical:

- Thymus.
- Lymph node.
- Spleen.
- Tonsils.

XIII. Skin:

- Skin structure.
- Types of skin.
- Hair.
- Nail.
- Glands.
- Melanocytes & melanin synthesis.
- Dermis & epidermis.

Practical:

- Thick skin.
- Thin skin.

XIV. Digestive System:

- Oral cavity.
- Teeth.
- Tongue.
- Pharynx.
- Esophagus.
- Stomach.
- Small Intestine.
- Large Intestine.

XV. Digestive glands:

- Salivary Glands.
- Pancreas.
- Liver.
- Gall Bladder.

Practical:

- Lip.
- Lingual papillae.
- Tooth.
- Esophagus.
- Cardio esophageal junction.
- Stomach, pyloroduodenal junction.
- Duodenum, jejunum & ileum.
- Appendix.
- Colon, recto anal junction.
- Salivary and pancreatic glands.
- Liver and gall bladder.

XVI. Respiratory System:

- Nasal Cavity.
- Paranasal Sinuses.
- Nasopharynx.
- Larynx.
- Trachea.
- Bronchial Tree.
- Alveoli.
- Pleura.
- Nerve and vascular supply.

Practical:

- Epiglottis.
- Trachea.
- Intrapulmonary bronchus.
- Lung (fetal & adult).

XVII. Urinary System:

- Kidneys: structure and ultrastructure.
- Bladder.

- Urinary Passages.

Practical:

- Kidney.
- Ureter.
- Urinary bladder.

XVIII. Endocrine System:

- Pituitary gland.
- Adrenal glands.
- Thyroid gland.
- Parathyroid gland.
- Pineal gland.

Practical:

- Pituitary.
- Thyroid & parathyroid.
- Adrenal.
- Pineal.
- Islets of Langerhans.

XIX. Male Reproductive System:

- Testis and scrotum.
- Spermatogenesis.
- Intratesticular genital ducts.
- Epididymis.
- Vas deferens.
- Urethra.
- Accessory glands; seminal vesicles, prostate, and bulbourethral glands.
- Penis.

Practical:

- Testis.
- Epididymis.
- Vas deference.
- Prostate.
- Seminal vesicle.
- Penis.

XX. Female Reproductive System:

- Ovary and types of follicles.
- Uterine tube.
- Uterus.
- Menstrual cycle.
- Placenta.
- Vagina.
- External genitalia.
- Mammary glands.

Practical:

- Ovary.
- Corpus luteum.

- Uterine tube.
- Uterus, proliferation & secretion.
- Vagina.
- Placenta.
- Umbilical cord.
- Mammary gland.

XXI. Sense Organs:

- Receptor of general sensibility.
- Chemoreceptors, taste, & olfaction.
- Eyeball, general development.
- Outer fibrous & middle vascular coat.
- Retina.
- Refractive media, eyelid, lacrimal apparatus.
- Ear, external, and middle.
- Inner ear: Organ of Corti, crista ampularis, macula.
-

XXII. HUMAN GENETICS:

- Introduction: Genetics and the Organism, the Structure of Genes and Genomes.
- Normal human chromosome, karyotype (Male, Female), classification and Cell division.
- Gene Function, the Transmission of DNA at Cell Division, inheritance of Single-Gene.
- Genetic Recombination in Eukaryotes, recombination in Bacteria and Viruses.
- Recombinant DNA and Genetic Engineering, Genomics, gene Mutation: repair Processes.
- Mutational Dissection, regulation of Gene Transcription from Gene to Phenotype.
- Regulation of Cell Number: normal and cancer Cells, the genetic basis of development.
- Cell division and gametogenesis, modes of inheritance, single gene disorders.
- Chromosomal disorder 1, 2, Polygenic inheritance, intersex, Inborn errors of metabolism.
- Prenatal diagnosis, genetic counselling, abnormal Karyotypes, trisomy's, translocations.

REFERENCES:**Course books:**

- Medical Histology I; Falih H. Diwan, 2010.
- Basic Histology; Junqueira et al. 11th Ed.
- Textbook of histology. By Don W. Fawcett.
- Elements of medical genetic by Allan E. H. Emery and Robert F. Mueller.
- Bailys Textbook of Microscopic anatomy by D.E. Kelly, Wood and A.C. Enders

Supplementary books:

- Histology; Text & Atlas; Ross et al.
- Wheater's Functional Histology; Text & Atlas.
- Concise Histology; Bloom & Fawcett.
- Atlas of Histology; Di Fiore.
- Text and color Atlas by Wheater, Burkitt and Daniels

PHYSIOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Physiology	145	90	90	325

Course Objectives:

This course aims to enable students to:

- Acquire an appropriate functional background of cells, tissues, organs & systems.
- Integrate physiological data & mechanisms with the ongoing basic sciences: Anatomy, histology & biochemistry and clinical applications.
- Explore in detail the functions of the autonomic, neuromuscular, respiratory, cardiovascular, endocrinal, the reproductive the nervous, the renal and the digestive systems systems as well as their integration to achieve homeostasis.

Practical Objectives:

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

- Perform hematological tests; estimation of blood Hb, determination of the hematocrit value, the bleeding & clotting times and blood groups.
- Perform the most important respiratory function tests.
- Perform the measurement of the arterial blood pressure.
- Manipulate a stethoscope for hearing heart and respiratory sounds.
- Record and read an electrocardiogram.
- Present physiological scientific data in a graphical form.
- Perform a systematic examination of the nervous system: types of sensations, motor system, tendons jerks and muscle tone.
- Perform the most important visual tests: corneal, light & accommodation reflexes, visual acuity, color vision and visual field defects.
- Perform a preliminary examination of common endocrinal conditions: acromegaly, dwarfism and thyroid diseases.
- Integrate physiology with other basic and clinical sciences.

Learning Outcomes:

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

- Describe the cellular functions at the organelle and molecular level.
- Describe & explain the functions of the nerve cell, the nerve and muscle fiber grossly and at the molecular level.
- Describe & explain functions of the autonomic nervous system, different components of blood, and the respiratory and cardiovascular systems both grossly and at the molecular level.
- Describe the functions of the endocrine, the reproductive, the renal and the digestive systems at the organ and at the molecular levels.
- Describe the metabolism from the physiology point of view.
- Describe some biophysical laws and their relation to physiology.

Student Assessment Methods:

- Written examination to assess knowledge and understanding and intellectual skills.
- Oral examination to assess knowledge and understanding, attitude and general skills.
- Practical examination to assess practical skills in diagnosis of different tissues under the microscope.

SYLLABUS:**I. Introduction: Cell Physiology:**

- The cell transport mechanism.
- Cell membrane: morphology of cell & transport of substances across the cell membrane.
- Forces affecting the transport.
- Body fluids: composition and compartments.
- Ionic channels.
- Homeostasis and internal environment, forces responsible for movement of substances between compartment, regulation of ECF volume.

II. Autonomic nervous system:

- Division of the autonomic nervous system.
- Autonomic ganglia.
- Sympathetic distribution all over the body.
- The adrenergic receptors, types and drugs acting on.
- Parasympathetic nervous system:
 1. Cranial & Sacral parasympathetic outflow.
 2. Distribution of parasympathetic nervous system.
 3. Drugs acting on parasympathetic nervous system.
- Autonomic tones.
- Autonomic denervation.
- Higher control of autonomic nervous system:
 1. Sympathetic integration with adrenal medulla.
 2. Hypothalamic control.
- The plasma proteins, types, separation, functions of plasma proteins.

III. Blood and immunity:

- Physical properties.
- Blood coagulation, Homeostasis, Mechanism of blood coagulation.
- Blood platelets.
- Anticoagulants.
- Bleeding and thrombotic disordered diseases.
- Red blood corpuscles.
- Functions of hemoglobin.
- Hemopoiesis & Factors affecting erythropoiesis.
- Hemolysis.
- Blood indices.
- Anemia.
- Hematocrit.
- Sedimentation rate.
- Blood transfusion.
- Blood groups & OAB system, blood typing, transfusion reaction, Rh blood groups, Rh immune response.
- Red blood cells: production of RBC, types and formation of hemoglobin, iron metabolism, reticule- endothelial, anemia and jaundice, polycythemia.
- White blood cells: Types, site of formation, functions, physiological and pathological variations, leukemia, leukopenia, leukocytosis.
- Functions of spleen.

- Immunity: immune response, humeral immunity, cellular immunity, types of acquired immunity.

IV. Nerves and Muscles:

A. Nerves:

- Structure, function and types of nerves.
- Degeneration & regeneration of nerves.
- Resting membrane potential.
- Types of stimuli.
- Action potential.
- Excitability: metabolic and thermal changes.
- Neuromuscular transmission, end-plate potential, drugs affecting on neuromuscular junction, Myasthenia gravis.
- Properties of mixed nerves.

B. Muscles:

- Structure and function of different types of muscle tissues, different between skeleton, smooth and cardiac muscle.
- Source energy for muscle contraction and role of calcium strength duration curve.
- Mechanism of muscle contraction.
- Electrical, excitability, metabolic, mechanical and thermal changes.
- Types and function of smooth muscle twitch and affecting factors.
- Summation of contraction, tetanus & clonus, isotonic and isometric contraction, muscle fatigue, tetanus twitch and clonus, muscular atrophy and hypertrophy, electromyography.
- Muscle circulation.

V. Metabolism and thermoregulation:

- Definition, sources of energy & reaction liberating energy.
- Energy balance & metabolic rate (basal metabolic rate), measurement of BMR.
- Respiratory quotient.
- The specific dynamic action.
- Metabolism during muscular exercise.
- Body temperature:
 1. Regulation of body temp (thermoregulation).
 2. Heat balance, heat gain and heat loss, control centers.
 3. Thermoregulatory mechanism.
 4. Exposure to heat, Exposure to cold.
 5. Fever hyperthermia.
 6. Body temperature, fever, mechanism, basis of treatment, heat stroke, hypothermia.
- Food intake:
 1. Control of food intake, appetite.
 2. Obesity and physiological basis of treatment.
 3. Starvation: organic & inorganic metabolism during starvation.

VI. Digestion:

- Introduction: function anatomy & regulation of gastrointestinal functions.

- Mouth & esophagus: salivary secretion, composition and function of saliva, mastication, deglutition and digestion.
- Stomach:
 1. Nerve supply and function, gastric gland, mechanism of gastric secretion, gastric juice, HCL secretion motility.
 2. Vomiting, types and mechanism consequences of vomiting.
- GIT mobility, types, functions and mechanism.
- Pancreas: pancreatic juice, control of pancreatic secretion, and function.
- Liver:
 1. Bile & gallbladder, functions, bile secretion, bile salts & pigments, cholertics & cholagogues.
 2. Jaundice, bile pigments, jaundice cholecystography.
 3. The liver functions, Composition of bile salts and their functions, enterohepatic circulation of bile salts and bile acid.
- Small & large intestine:
 1. Intestinal secretions & motility.
 2. Defecation, constipation, & diarrhea.
 3. Absorption in GIT, absorption of water and salts, gastro colic and duodenocolic reflexes, gastro-ileal reflex, malabsorption syndrome, routes of absorption.
- GIT hormones and their functions.

VII. Kidney and acid-base balance:

- General function of kidney & nephron renal blood flow.
- The renal glomeruli, glomerular filtration rate, and plasma clearance, calculation of plasma clearance, the Fick principle, its application to assess renal function, filtration fraction, clearance of insulin for GFR, clearance of GFR, clearance of PAH and RPF, tubular movement of substance, maximum transport.
- Renal conservative of sodium, sodium reabsorption by active process and co transport mechanism, sodium transport in distal nephron segments, aldosterone, its importance and action, rennin-angiotensin aldosterone system, glomerulotubular balance.
- The renal tubules:
 1. Function of proximal convoluted tubules.
 2. Function of the loops of Henle.
 3. Function of the distal convoluted tubules.
 4. Tubular reabsorption, renal handling of water, role of antidiuretic hormone, tubular secretion, tubular mechanism for reabsorption of sodium, potassium, water, urea, glucose and bicarbonates.
 5. Mechanism of formation of concentrated and diluted urine, changes in osmolarity of the filtrate in various parts of nephron, the medullary, hyperosmolarity, the cortico-medullary gradient for total Solute concentration, medullary blood flow, urea recirculation, renal handling of urea, formation of diluted and concentrated urine, osmolar clearance & free water clearance.
- Diuresis and diuretic drugs: diuresis and action of diuretics, water and osmotic diuresis, effect of ICF and ECF volume receptors on ADH release, carbonic anhydrase inhibitors, furosemide.
- Acid- base balance:
 - I. Acids and bases: definition and meanings.
 - II. The function of acid-base buffers, the bicarbonate buffer system, respiratory regulation of acid-base balance, renal regulation of acid-base balance.

- III. Regulation of acid-base balance.
- IV. Hydrogen ion concentration and pH of normal body fluids, defense against changes in hydrogen ion concentration.
- V. Maintenance of acid-base balance.
- VI. Acidosis & alkalosis.
- VII. Role of kidney in acid-base regulation.
- Renal failure.
- Renal dialysis: The artificial kidney, renal function test, principle of dialysis, dialyzing fluid renal diseases (acute renal failure, nephritic syndrome, specific tubular disorder).
- Micturition, function anatomy of urinary bladder cystometrogram during bladder filling, Micturition reflex and control by higher center, abnormalities of micturition, over flow Incontinence, spastic neurogenic bladder.
- Body fluids; water balance, dehydration, hydration & edema.

VIII. Central nervous system:

- Introduction, review of gross anatomy and functions of CNS, formation and composition of CSF, blood –brain barrier (BBB).
- Receptors.
- Somatic sensations:
 - 1. Mechanoreceptors senses; tactile localization & discrimination, stereognosis, pathway of crude touch & fine touch, pressure sense, vibration sensation.
 - 2. Pathway of thermal sense.
- Pain sensation: cutaneous pain; pain pathway, deep pain, visceral pain, referred pain, lemnisci, somatic sensations areas of cerebral cortex.
- Sensory disturbances.
- Somatic sensation from the head & Sensory function of CNS, modalities of sensation, receptors: receptor potential, adaptation, stimulus strength response, physiology of spinal cord, ascending tracts, dorsal column, tracts: ventrolateral system, thalamus, connections and functions, cutaneous, deep and visceral, slow and fast, mechanisms and pathways of pain sensation, cutaneous, deep and visceral pain (referred pain), touch and temperature, proprioceptor sensation, hyperalgesia, hyperesthesia.
- Synapse, definition, structure, types, transmission and potentials.
- Reflex action; afferent & efferent neurons, superficial and deep reflex.
- Human reflexes; components, & types, reflex arc, general properties of reflexes.
- Stretch reflexes; pathway, types, properties and functions.
- Voluntary movements.
- Upper motor neurons.
- Lower motor neurons.
- Motor disturbances.
- Internal capsule structure and lesion.
- Spinal cord lesions.
- Cerebellum.
- Basal ganglia.
- Thalamus.
- Motor functions of CNS, motor cortex and control of voluntary movement, the pyramidal and extra-pyramidal system, the internal capsule, basal ganglia,

connections, functions and disorders (parkinsonism), upper motor neurons and lower motor neuron lesion, cerebellum, connections and functions, cerebral lesion, equilibrium, vestibular apparatus, function of semicircular canals, posture, regulation of posture, postural reflexes, muscle tone, decerebrate rigidity and supra-spinal regulation.

- Hypothalamus.
- Limbic system.
- The hypothalamus, connections and functions, neuroendocrine integration, control of autonomic function-limbic system and emotion, hunger and thirst.
- The reticular activating system sleep.
- Electroencephalogram.
- The cerebral cortex.
- Higher intellectual functions; learning, memory, speech & judgement of behavior.
- Postural reflexes and equilibrium.
- The brain stem.
- The spinal cord.
- Some common neurological disorders and abnormalities, transection of the spinal cord (paraplegia), hemi section of spinal cord (Brown-Sequard syndrome), hemiplegia, parkinsonism, Tabes dorsalis, dorsal root and posterior column lesion, syringomyelia.

XXIII. Special senses:

A. Vision:

- Introduction, physiological anatomy of the eye eyeball & accessory organs.
- Cornea.
- Sclera.
- Aqueous humor.
- Intraocular pressure, glaucoma.
- Middle vascular layer.
- Pupillary light reflex; accommodation to near vision, light reflex and its pathway, accommodation, convergence reflex, presbyopia, Argyll-Robertson pupil.
- Retina, optic nerve & lens: the near points of the vision, image forming mechanism, biconcave and biconvex lenses, errors of refraction, visual acuity, perimetry, binocular vision.
- Color vision & visual fields: tricolor mechanism of color reception, types of color blindness, test of color blindness.
- Visual pathway & lesions.
- Neurophysiology of vision: role of horizontal, amacrine and ganglion cells, visual pathway, functions of primary visual cortex, eye movements and their control, fusion of visual images, pupillary aperture, and control of pupillary diameter.
- Photochemistry of vision: the photoreceptor mechanism, photopic and scotopic vision, electroretinogram (ERG), rhodopsin and dim light vision, dark and light adaptation, vitamin A.

B. Hearing:

- External, middle & inner ear.
- The sense of hearing: the tympanic membrane and ossicular septum, transmission of sound through the bone.

- The cochlea, functional anatomy, transmission of sound waves in cochlea, functions of organ of Corti, determination of sound frequency and loudness.
- Mechanism of hearing, transmission of sounds, stimulation of organ of Corti.
- General auditory mechanism: the auditory pathway, cerebral cortex in hearing, pitch frequency and amplitude of sound, hearing threshold.
- Abnormalities of hearing: types of deafness and their tests, audiometry, hearing aids.

C. Taste:

- Adoption, importance.
- Mechanism of taste sensation.
- Pathway of taste sensation, transmission of taste, signal into CNS.
- Disturbance of taste sensation.

D. Smell sensation:

- Importance of smell sensation.
- Olfactory mucosa, olfactory receptors, olfactory membrane, stimulation of olfactory cells.
- Olfactory pathway & transmission of smell into CNS.
- Sniffing.
- Disturbance of smell sensation.

XXIV. Endocrinology:

A. Introduction: definition, types of hormones, chemistry, mechanism action of hormones.

B. Pituitary gland:

- The anterior pituitary gland (morphology, histology & chemistry).
- Hormones secreted by the anterior part of pituitary gland.
- Regulation of secretion, their action and their sources.
- Growth hormone; effects, actions, & regulation.
- Disturbance of anterior pituitary secretion (disorders of growth hormone secretion).
- The posterior pituitary gland (morphology, histology & chemistry), mechanism of action and control of secretion.
- Oxytocin hormone.
- Vasopressin hormone.
- Diabetes insipidus.

C. Thyroid gland:

- Morphology, histology & chemistry.
- Thyroid Hormones, biosynthesis & secretion transport and metabolism of the hormones.
- Actions & regulation of secretion.
- Goiter.
- Disease of thyroid gland & antithyroid drug.

D. Parathyroid gland:

- Morphology, histology & chemistry.
- Parathyroid hormone; action, effect, source & regulation.
- Diseases of parathyroid.
- Hormones controlling blood calcium, phosphorus level.
- Thyrocalcitonin hormone; effects & regulation.

E. Pancreas:

- The endocrine function of pancreas; secretion, actions, source & regulation.
- Insulin; secretion, actions, & regulation.
- Somatostatin.
- Diabetes mellitus.

F. Adrenal gland:

- Morphology, histology & chemistry.
- The mineralocorticoids hormones; action & regulation.
- The glucocorticoids hormones; action & regulation.
- The sex hormones.
- Disorders of suprarenal cortex.

G. Pineal gland.**XXV. Reproduction:****A. Male reproduction system (gonads):**

- Morphology, histology & chemistry.
- Spermatogenesis & affecting factors.
- Endocrine function of testis (testosterone).
- Accessory male sex glands.
- Semen.

B. Female reproductive system:

- Morphology, histology & chemistry.
- Ovarian cycles, menstrual cycle, cervical, vaginal and breast cycle.
- Endocrine function (ovarian hormones).
- Pregnancy, fertilization & implantation, endocrine and physiological changes, pregnancy tests, Placenta hormones, lactation, prevention of pregnancy.
- Labor.
- Mammary glands (prolactin hormones), secretion and ejection of milk.
- Prostaglandins.
- Puberty.

XXVI. Cardiovascular system:

- a. Introduction & historical review.
- b. Physiological anatomy.

A. The heart:

- Innervation of the heart.
- Normal and abnormal properties of the heart.
- Regulation of cardiac function: intrinsic auto-regulation of cardiac pumping.
- Cardiac cycle: phases of cardiac cycles, systolic and diastolic atria and ventricles as cardiac pumps, relationship between heart rate and cardiac cycles, pressure and volume changes in atria.
- Ventricles and aorta jugular venous pressure heart sounds and their causes.
- Electrocardiogram: phases of normal ECG, various waves and intervals, voltages and time calibration unipolar and bipolar leads, cardiac vector, mean electrical axis of the ventricles, cardiac arrhythmias, ECG changes in extrasystole, heart block, flutter and fibrillation, phonocardiogram, echocardiogram.
- Cardiac output and venous return: definition of cardiac minute volume, stroke

volume and cardiac Index, factor affect output, regulation of cardiac output and stroke volume.

- Hemodynamic: pressure, flow and resistance, their interrelationship, hematocrit and resistance Laminar and turbulent blood flow, total peripheral resistance, arterial and venous blood pressure, Effects of gravity, vascular compliance, critical closing pressure, Raynolds number and turbulent Flow, Poiseuille's equation, law of Laplace and its application to the heart and capillaries.
- COP measurement and regulation.
- Heart rate and electrophysiology of cardiac muscle: contraction of cardiac muscle, absolute and relative refractory period.
- Cardiac reserve.
- Mechanical efficiency of the heart, origin and conduction of cardiac impulse.

B. Vascular system:

- Arterial and Arteriolar circulation, functional parts of circulation, distribution of blood in various compartments, pressure velocity and total cross-sectional area and their inter-relationship.
- Arterial blood pressure and its regulation (normal values of different pressures, physiological factors affecting arterial blood pressure, regulation of arterial blood pressure, nervous regulatory mechanism peripheral chemoreceptors and baroreceptor, carotid sinus reflex, CNS ischemic response, humeral regulatory mechanism, renin-angiotensin system, renal body fluid Control system , aldosterone control system).
- Capillary circulation, capillary dynamics and formation of tissue fluid, filtration pressure and oedema, active and inactive capillaries formation.
- Coronary circulation and ischemic heart disease: measurement and control of coronary blood flow.
- Microcirculation and its regulation: local regulation of blood flow, functional anatomy of microcirculation, blood flow to different region, autoregulation of blood flow effect of tissue metabolism and O₂ concentration, effect of vasodilator substance.
- Vasomotor center: vasomotor tone afferent impulses to vasomotor center, stimulation of vasomotor center vasovagal syncope, reflex stimulation of circulation, baroreceptor reflex, humeral Regulation of circulation, circulating vasoconstrictor and vasodilator substances.
- Venous circulation, venous pressure, venous pump cardiac catheterization, central venous pressure.
- Pulmonary circulation: function anatomy of pulmonary vessels, blood pressure in various segment of lung, effect of posture, ventilation perfusion ratio, alveolar PO₂ and pulmonary vascular Resistance autoregulation of pulmonary blood flow effect of PO₂ pulmonary capillary membrane dynamic, pulmonary oedema, pulmonary arterial pressure and its relationship with cardiac output and left atrial pressure, exercise and pulmonary arterial pressure.
- Cerebral circulation, measurement and control of blood flow.
- Lymphatic circulation and function of lymphatic system.
- Cardio vascular changes in health and disease:
 1. Effects of muscular exercise: cardiac output, arterial blood pressure and heart rate in exercise.
 2. Hypertension, hemorrhage & shock: definition and sign of shock, mechanism of shock and treatment.
 3. Heart failure.

4. Ischemic heart disease (atherosclerosis, angina pectoris, acute coronary occlusion myocardial infarction).

XXVII. Respiration:

- a. Physiological anatomy of the respiratory system; Conducting and Respiratory zones.
- b. Definition, structure, units, symbols, laws, measurement of gas volumes & concentrations.
- c. Intrapleural pressure, lung volume, static lung compliance, chest wall compliance, total thoracic compliance.
- d. Types of airflow, airway resistance, work of breathing.
- e. Blood flow in lungs, regional distribution of blood flow, control pulmonary blood flow.
- f. Respiratory cells.
- g. Respiratory tones.
- h. Types of respiration.
- i. Respiratory cycle and mechanism of respiration.
- j. Intrapulmonary pressure, intrapleural pressure.
- k. Surfactant, compliance.
- l. Work of breathing.
- m. Lung volumes and capacities.
- n. Pulmonary function tests; static and dynamic.
- o. Residual volume.
- p. Vital capacity and ventilation perfusion ratio and its abnormalities.
- q. Minute respiratory volume, dead space.
- r. Exchange of gasses:
- s. Respiratory function of blood:
 1. O₂ & CO₂ carriage and transport.
 2. O₂ dissociation curve.
- t. Regulation of respiration:
 1. Nervous regulation of respiration.
 2. Respirator centers & respiratory rhythm, voluntary control of breathing.
 3. Chemical regulation of respiration.
 4. Hypoxia, asphyxia, decompression sickness.
 5. Cyanosis.
 6. Abnormal patterns of breathing.
 7. Pneumothorax.
- u. Metabolic functions of the lung.
- v. Effects of muscular exercise on respiration:

Practical:

The practical classes include the following:

Blood and immunity:

- RBCs & WBCs Count
 1. Introduce the student to the hematology lab.
 2. Learn the basic techniques used in counting & the clinical implication of this count

Central Nervous System:

- **Sensory Examination**

1. **Superficial sensations:** Pain, Touch, Temperature
2. **Deep Sensations:** Pressure, Tension, Vibration, Position, Movement.

- **Motor Examination**

1. Examination of muscle power.
2. Examination of muscle state.
3. Examination of muscle tone.
4. Examination of muscle reflexes.

- **Superficial reflexes:** planter reflex; abdominal reflexes.

- **Deep reflexes:** ankle jerk; knee jerk; biceps jerk; supinator jerk.

1. Examination of clonus.
2. Examination of coordination.

Special senses:

- **Sensory Examination**

1. Determination of the visual acuity
2. Performance of the hearing tests

Cardiovascular System**1- Heart:**

- a. ECG: Understanding the concept of calibration and paper speed, recording of ECG from limb leads and chest leads, measurement of the duration of the different waves and ECG intervals, and interpretation of normal ECG.
- b. Determination of the cardiac vector.
- c. Calculation of heart rate.

2- Circulation:

- a. Measurement of the systolic and diastolic blood pressure.
- b. Calculation of the pulse pressure and mean arterial blood pressure.

Respiration:

- **Spirometry**

1. Define the different lung volumes and capacities and determine the amounts of these measurements in a spirogram.
2. Describe and perform the forced expiratory volume and maximum breathing capacity test and determine these measurements in a spirogram.

Explain how pulmonary function tests are used in the diagnosis of restrictive and obstructive pulmonary disorder.

REFERENCES:

- Review of Medical Physiology; Ganong.
- Medical Physiology; Guyton & Hall.
- Medical Physiology; Best & Taylor.

BIOCHEMISTRY

Teaching in biochemistry includes scope of medical biochemistry, biochemical morphology of cells, enzymes, coenzymes, oxidative phosphorylation, carbohydrate metabolism, protein and amino acids metabolism, biochemical endocrinology, hemoprotein synthesis and breakdown, body fluids, nutrition, ion transport, fat-soluble vitamins, minerals and trace elements, biochemistry of cell membrane, biochemistry of muscle contraction, neurochemistry, acid-base balance, immunochemistry, biochemistry of chromatin, recombinant DNA and genetic engineering, Hb variants, clinical enzymology, detoxication, gastro-intestinal secretions, renal function, biochemistry of connective tissues and chemistry of blood.

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Biochemistry	156	120	90	366

Course Objectives:

This course aims to enable students to:

- Understand the basic chemistry of carbohydrates, lipids, and proteins.
- Become familiar with structure, classification, function and mode of action of various chemical compounds in the living cell.
- Understand the structure of biochemical membranes.
- Understand the structure, classification, and function of the nucleic acids (DNA & RNA).
- Know the structure of vitamins, enzymes, body fluids, and minerals.
- To give the students insight into appreciating how understanding of metabolic processes occurring in the human body, could contribute to the understanding and explanation of pathological phenomena.
- To make students familiar with the various control and integrating mechanisms of diverse biochemical events in different metabolic processes, and to understand normal and abnormal human metabolism.
- Knowledge of basic chemical constituents of biological fluids in health and disease, with the ability to determine the relevant investigations for their applications in clinical diagnosis.
- To enable the student to illustrate and/or describe the metabolic pathways of purines and pyrimidines bases.
- To enable the student to point out the bioenergetics of the concerned metabolic pathways under different physiological circumstances.
- To make students familiar with structure, function and mode of action of hormones in health and disease.
- To enable the student to illustrate and/or describe the role of selected mineral in the metabolism.
- To enable the students to point-out different mechanism which the body uses to get rid of various types of foreign chemical as drugs food, additive and pollutants.

Practical Objectives:

- Identify the physical and chemical characters of normal urine under different physiological conditions.
- Perform chemical tests to detect abnormal constituents of urine.

- Estimate serum levels of glucose, total proteins, albumin, cholesterol, creatinine and uric acid by colorimetric methods.
- Assess glucose tolerance by glucose tolerance test.

Learning Outcomes:

By the end of the course, student should:

- Become familiar with the structure and types of carbohydrates, lipids, proteins, and nucleotides.
- Describe the components of some body fluids; blood, urine, milk, semen, CSF and sweat.
- Understand the biochemical changes of different compounds in the human body.
- Diagnose the chemical compounds of different samples of body fluids.
- Define the metabolic pathways of carbohydrates, lipids, proteins, nucleotides and their micro-molecules and determine the site of each.
- Point out the functions of hormones and minerals, their biochemical, clinical and laboratory importance and deficiency manifestations.
- Understanding the role of antioxidants in prevention and treatment of chronic diseases.
- Interpret symptoms, signs and biochemical laboratory findings of some metabolic disorders.
- Point out the clinical significance of determination of plasma levels of glucose, total proteins, albumin, cholesterol, creatinine and uric acid.

Student Assessment Methods:

- Written examination to assess students understanding of the metabolism of different biochemical compounds.
- Oral examination to assess student's capability to integrate different biochemical reactions in the human body.
- Practical examination to assess practical skills in diagnosis of different biological compounds.

SYLLABUS:

I. Introduction:

the biochemical characteristics of living matter. The scope of medical biochemistry.

II. Physio-chemical:

- Molarity, normality, mass concentration, acids and bases, dissociation of acids and bases.
- Ampholytes, electrolyte and non-electrolytes, pH, definition, measurement and dissociation of H₂O, Henderson Hasselbach equation, Buffers, titration curves.
- Biochemistry and morphology of cells: cell membrane, cell organelles, nucleus, nucleoli, mitochondria, lysosome, ribosomes, PER, SER.
- Microsomal fraction.

III. Enzymes:

- Definition, intracellular, localization of enzymes, isolation and purification of enzymes.
- Enzymes, cofactors and coenzymes.

- Proenzymes and isoenzymes (clinical fields of application).
- Measurement of enzyme activity.
- Specificity, enzymes as catalysts.
- Mechanism of enzyme action, key and lock theory, induced fit theory (Koshland) the catalytic step (orbital steering, how enzymes lower the free energy activation of reaction).
- Elementary principles of enzyme kinetics, enzyme inhibitors (irreversible, reversible competitive and non-competitive), and regulation of enzyme activity (allosteric enzyme, covalent modification), Koshland and Monod models.

IV. Amino acids and proteins:

Definition, classification and chemical reactions.

V. Vitamins and coenzymes:

Definition of coenzymes:

- Coenzymes involved in major electron carrier in the oxidation reduction NAD, FMN, lipoic acid.
- Coenzymes participating in group transfer reactions, TPP, PLP, FH, cobalamin coenzyme, biotin, co-enzyme A, adenylic coenzymes ATP, UDP, FAPS, L-ascorbic acid.
- Metallo enzymes.
- Conversion of pyruvic acid to acetyl Co. A (as an example of involvement of coenzyme in multienzyme system).

VI. Introduction to metabolism:

Definition, sequence of metabolic reactions, metabolic pathways, methods of study.

VII. Carbohydrate chemistry and metabolism:

- Definition, classification and chemical reactions.
- Digestion and absorption of carbohydrates: enzymes, active transport mechanism, fate of absorbed sugars.
- Intermediary metabolism: survey on major pathways.
- Metabolism of hexoses: initial phosphorylation reactions, enzymatic inter-conversion of hexoses, formation and degradation of glycogen, liver glycogen degradation (glycogenolysis), liver and muscle regulation of glycogen metabolism.
- Glycolytic pathways: anaerobic glycolysis, formation of pyruvic acid, lactic acid and alcohol, inhibition, energetics, regulatory mechanisms.
- Oxidative decarboxylation of pyruvic acid: formation of acetyl Co-A.
- Tricarboxylic acid cycle: reactions of the cycle, inhibitors, energy production, formation of ATP, carbon dioxide fixation reactions, integration of carbohydrates, lipids and proteins metabolism through tricarboxylic acid cycle.
- Alternative pathways of carbohydrate metabolism: hexose monophosphate shunt (HMP), the uranic acid pathway, metabolism of fructose, galactose.
- Gluconeogenesis: metabolic pathway involved in gluconeogenesis.
- Regulation of carbohydrate metabolism: sources and concentration of blood glucose, hormonal regulation.

VIII. Bioenergetics:

Biologic–oxidation (the respiratory chain and oxidative phosphorylation):

- Mitochondria: ultrastructure and functional organization.
- Oxidation-reduction potential and free energy changes.
- Carriers present within ETC, NADH, ubiquinones, cytochromes.
- The use of respiratory inhibitors: rotenone, amytal, antimycin, CN, CO, N, malonate, the use of uncoupled DNP, oligomycin ionophores.
- Complex 1,2,3,4 submitochondrial particles.
- P/O ratio, No. of ATP released from complete oxidation of one molecule of glucose, substrate level phosphorylation.
- How electrons are transferred from extramit to intramit, the glycerolphosphate and malate shuttle.
- Mechanism of oxidative-phosphorylation:
 - Chemical coupling.
 - Chemiosmotic hypothesis.
 - Conformational coupling.

IX. Lipids (chemistry and metabolism):**Part I:**

1. Definition, function and classification of lipids.
2. Digestion and absorption of lipids:
 - a. Bile, hydrolytic enzymes (pancreatic lipase)
 - b. Absorption and re-esterification.
 - c. Chylomicrons, adipose tissue.

Part II:

1. Structures, general properties, sources of the fatty acids.
2. Fatty acid oxidation:
 - a. β -oxidation of F.A.
 - b. β -oxidation of unsaturated fatty acids.
 - c. β -oxidation of odd chain fatty acids.
 - d. Omega-oxidation and alpha oxidation.

Part III:

1. Sources of acetyl-CoA.
2. Formation of malonyl CoA.
3. Acyl carrier protein.
4. Fatty acid synthase reactions.
5. Forces of NADPH for R.A synthesis.
6. Elongation of fatty acids.
7. Δ -saturation of fatty acids.
8. Integration-arachidonate synthesis.
9. Prostaglandin synthesis.

Part IV: Triacylglycerol's metabolism:

1. Alpha glycerol phosphate pathway.
2. The monoglyceride pathway.
3. The dihydroxy acetone –P–pathway.
4. Breakdown of TG.

Part V: Phosphoglyceride biosynthesis:

1. Phospholipids.
2. Sphingolipid biosynthesis (glycosphingolipids storage disorder).

Part VI: Cholesterol:

1. Occurrence, chemistry, biosynthesis.
2. Products of cholesterol metabolism (E.G bile).
3. Role of cholesterol in arteriosclerosis and atherosclerosis.

Part VII: Lipid transport:

1. Plasma lipid.
2. Plasma lipoproteins.
3. Hyper and hypolipoproteinemia.

Part VIII: Ketone body metabolism:

1. Synthesis and utilization.
2. Ketosis (ketonuria, ketonemia).

X. Proteins and amino acid metabolism:

- Biological role of proteins (hormones, enzymes, etc.).
- Digestion of proteins and absorption of amino acids, proteolytic enzymes, secretion of hydrolytic acid in the stomach, glutamyl cycle for amino acid transport.
- Essential amino and nonessential amino acids, glycogenic and ketogenic amino acids.
- Metabolic pathways of amino acids: oxidative deamination, transamination, transdeamination, transmethylation, decarboxylation, transport of ammonia, fixation of ammonia, urea cycle, synthesis and metabolism of creatinine and creatin, metabolism of the carbon moiety, interconversion of amino acids, biosynthesis of nonessential amino acids.
- Metabolism of certain individual amino acids, glycine, serine, aspartic and glutamic acids, and glutamine, arginine, histidine, phenylalanine, tryptophan, cystine and methionine, conversion of amino acids to specialized products.
- Normal control of amino acid metabolism.
- Disorders of amino acids metabolism, inborn error of amino acid metabolism.

XI. Nucleic acids and nucleoproteins metabolism:

- Nucleoproteins: types (nucleoprotamines, nucleohistones), hydrolysis products.
- Nucleic acids: types (DNA, m RNA, rRNA, tRNA), intracellular localization, purine and pyrimidine, sugars.
- Nucleotides and nucleosides: nomenclature, structure, biologically important free nucleotides and nucleosides.
- The three dimension structure of the DNA, primary, secondary and tertiary structure, internucleotide linkage, molecular weights, double helical structure, base – pairing rule, structure of DNA (physical properties, effects of agents).
- Three-dimensional structure of RNA (m, r, t, RNA), amino acid specificity of RNA, anticodons of t RNA.
- Metabolism of purines and pyrimidines: digestion of nucleoproteins and nucleic acids, absorption, and fate of the bases, biosynthesis, and degradation, purines and pyrimidines, uric acid metabolism and excretion.

XII. Integration and regulation of metabolism:

metabolic pathways, carbohydrates, lipids and proteins and their metabolism integration and regulation.

XIII. Introducing the special topics**XIV. Body fluids and acid-base balance:****A. Urine:**

- Role of Kidney.
- Production of Urine.
- Normal constituents of urine.
- Abnormal constituents of urine.
- Clinical importance.

B. Milk:

- Secretion.
- Composition.
- Hormonal control.
- Nutritional importance.

C. Blood:

- Constituents of blood and its functions.
- Plasma proteins and its functions.
- Blood clotting.
- Coagulation factors.

D. Semen.**E. Cerebrospinal fluid (CSF).****F. Acids.****G. Bases.****H. PH.****I. Buffers.****J. Acid-base balance.****K. Alkalosis and acidosis.****XV. Nutritional biochemistry:**

- Basal metabolism, measurement of energy requirements, specific dynamic action, recommended daily allowance, nutritional aspects of proteins and amino acids, nutritional aspects of lipids and carbohydrates (nutritional disorders).
- Mineral metabolism: metabolism of CA, NA, K, CL, Sulphur.
- Metabolism of trace elements like copper, zinc, iron, fluorine, iodine and manganese.

XVI. Detoxification:

- Formation and breakdown of foreign compounds in the body, different types of detoxification mechanisms.
- Toxicology and drugs: oxidation, reduction, conjugation, hydrolysis and methylation.
- The microsomal P 450 system.

XVII. Biological role of nucleic acids (protein biosynthesis):

- Storage of genetic information: the genetic code, codon and anticodons degeneracy, mutation.

- Transmission of genetic information: replication of genetic material, Kornberg- DNA polymerase, Okazaki fragments and reverse transcriptase.
- Conversion of genetic information to protein structure. The transcription process: RNA synthesis, DNA dependent RNA polymerase. The translation process: ribosomes, activation of amino acids.
- Phases of protein biosynthesis:
 - Initiation.
 - Elongation.
 - Termination and release. Inhibitors of protein synthesis.

XVII. Recombinant DNA technology:

The genetic element that control gene expression methods for creating of recombinant DNA molecules. Transfer of genes into mammalian cells recombinant DNA and genetic diseases.

XVIII. Hemoproteins, porphyrins and hemoglobin variants:

- Chemistry: types and occurrence of hemoproteins, structures, physical and chemical properties of Hbs, myoglobin, catalase, peroxidases, and cytochromes.
- Metabolism: biosynthesis of porphyrin ring system, catabolism of Hb and porphyrin, formation of bile pigments.
- Hb. variants: normal Hb, adults newborns and embryonic Hb, the organization of human Hb genes. Abnormal Hb, mutations: e.g. Hb. S, Hb M, thalassemia.

XIX. Cell membrane and ion transport:

- The major chemical components of the cell membrane, structural organization, disorders of membranes.
- Ion transport: differentiate among nonimmediate (passive transport), passive mediated transport and active transport, how energy metabolism is coupled to ion transport in the cell. Na-K-ATPase. Transport of glucose and amino acid. Role of antibiotics in ion transport.

XX. Biochemistry of hormones:

- Steroid hormones: chemistry and nomenclature, biosynthesis of pregnolone from cholesterol and its regulation. Biosynthesis of glucocorticoids and mineral corticoids. Biosynthesis and metabolism of adrenergic steroids by the adrenal cortex and the gonads. Biosynthesis and metabolism of estrogen A brief account on the fetoplacental unit and the female menstrual cycle. Biochemical tests for assessing steroid production in normal and pathological conditions. Excretion of steroids metabolites and conjugates. Function and disorders of steroid hormones.
- Parathyroid hormone: calcitonin and calcium metabolism: absorption and loss of calcium from the body, biochemical factors, which influences calcium hemostasis, nature and chemistry of PTH and calcitonin, hyper and hypocalcemia due to abnormal PTH production. Biochemical tests in assessing calcium metabolism, parathyroid hormone and bone disease. Effects of parathyroid hormones on calcium and phosphate concentration in the body fluids.
- Thyroid hormone: iodine metabolism and the biosynthesis of thyroid hormones, thyroxine and triiodo-thyronine, circulating thyroid hormone and their metabolism. Biochemical tests for assessing thyroid status LATS in hyperthyroidism. Action of thyroid hormone, regulation of thyroid hormone secretion, effects of thyroid hormone and their metabolism.
- Pituitary hormones: nature and characteristics of releasing and release – inhibiting factors, nature and characteristics of anterior and posterior pituitary hormones, their

measurement. Function of pituitary hormones secretion, and control mechanism of the pituitary hormones.

- Catecholamines: nature and characteristics, biosynthesis of adrenalin and noradrenaline, their metabolism. Biochemical tests in pathological conditions. Action and disorders of catecholamines.

XXI. Clinical enzymology:

Enzymes are used as Lab. tools, therapeutics agents, in genetic disease diagnosis and counselling and for diagnostic and management purpose. Discussion of enzymes commonly arranged in relation to organ or disease of interest.

XXII. Biochemistry of muscle contraction:

Structure of myosin, actin, tropomyosin and their arrangements in the muscle. The role of the sarcoplasmic reticulum network in the initiation of contraction and relaxation. Present current concepts of the mechanisms of muscular contraction and the role of Ca. in the process. How the mechanism of muscle contraction in smooth muscle differs from that of the heart or skeletal muscle. The mechanism of relaxation following muscular contraction. The role of phosphocreatine and the ATP in muscle activity.

XXIII. Biochemistry of connective tissue:

Collagen and elastin: amino acids composition, structure and biological function.

XXV. Neurochemistry:

General composition of the nerve tissue and the association of this composition with function. Chemical composition of the brain metabolism of the brain and CNS with special references to glucose and amino acid metabolism, synaptic transmission, neurotransmitter, biochemistry of learning and memory, and neurohormones.

XXVI. Immunochemistry:

Introduction: the combining sites of the antibodies are like the active sites of the enzymes, classes of antibodies, light and heavy chains and biological activity.

Practical Biochemistry and Molecular Biology.

The practical lessons include:

1. Preparing chemical solutions,
2. Studying molarity, pH, and acid-base dissociation using the Henderson-Hasselbalch equation.
3. Isolating and measuring enzyme activity, and understanding their mechanisms, such as the lock and key theory.
4. Amino acid and protein metabolism, including digestion, absorption, and metabolic pathways.
5. The metabolism of carbohydrates, lipids, and vitamins.
6. Identify the hormones.
7. Demonstrate the process of protein synthesis.
8. Demonstrate the regulation of gene expression process.
9. Demonstrate the structure of genetic materials, the process of transcription, and translation.

10. Apply PCR, DNA sequencing, pharmacogenetics, and recombinant DNA procedures.
11. Interpret the principles of clinical enzymology.
12. Apply the biochemistry of porphyrin and bile pigments.

REFERENCES:**Course books:**

- Harper's Biochemistry by: Robert K. Murry.
- Biochemistry: a case-oriented approach by: Montgomery R et al.

Supplementary books:

- Lippincott's Reviews of Biochemistry; 3rd edition by Champe PC, Harvey RA, Ferrier DR, Lippincott William & Wilkins London, 2005.
- Text book of Biochemistry with Clinical Correlations 5th Ed, Devlin TM Ed. Wiley -Lewis New York 2002.
- Harper's Illustrated Biochemistry; 26th Ed by Murray RK, Granner DK, Mayes PA, Rodwell VW, McGraw-Hill companies New York, 2003.

Web Sites:

- <http://www.kumc.edu/biochemistry/resource.html>
- <http://www.medlib.iupui.edu/ref/biochem.htm>

SECOND STAGE**THIRD MEDICAL YEAR****PATHOLOGY**

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Pathology	120	80	80	280

Course Objectives:

This course has been designed to:

- Provide the medical students with the concepts of etiology, pathogenesis, microscopic and gross morphology, complications, and clinicopathologic correlation of human diseases through general and system-based approaches.
- Focus on gaining competency in medical knowledge, with specific emphasis on core discipline and problem-solving competencies.

Practical Objectives:

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

- Perform hematological tests; estimation of blood Hb, determination of the hematocrit value, the bleeding & clotting times and blood groups.
- Perform the most important respiratory function tests.
- Perform the measurement of the arterial blood pressure.
- Manipulate a stethoscope for hearing heart and respiratory sounds.
- Record and read an electrocardiogram.
- Present physiological scientific data in a graphical form.

Learning outcomes:

By the end of the course, students should:

- Understand and analyze the pathologic features of a disease (gross and microscopic to know the diagnosis).
- Know the functional consequences and prognosis of pathologic processes.
- Understand the relationship between laboratory and morphological changes in diseases states.
- Anticipate the natural course of disease.
- Learn how pathology applies to the practice of medicine.
- Understand possible avenues of medical or surgical therapy.

Student Assessment Methods:

- Written examination to assess knowledge and understanding and intellectual skills.
- Oral examination to assess knowledge and understanding, attitude and general skills.
- Practical examination to assess practical skills in diagnosis of different tissues under the microscope.

SYLLABUS:**I- General Pathology:****1. Introduction:**

- Applications of pathology, cause of disease, course of disease, pathogenesis, signs, symptoms, complication, prognosis, why and how to learn pathology.
- Diagnostic histopathology and cytology.
- Genetic diseases: mutation, mendelian disorder (diseases caused by single-gene defect); disorders with multifactorial inheritance, cytogenic disorder.

2. Adaptation, Cell Injury & Cell Death:

- Adaptation: atrophy, hypertrophy, hyperplasia, metaplasia.
- Cell injury: reversible and irreversible (necrosis & apoptosis).
- Intracellular accumulations.
- Pathological calcifications: Dystrophic & metastatic calcifications.
- Cellular aging.

3. Inflammation and Repair:

- Acute inflammation: Features, events & outcomes of acute inflammation.
- Chronic inflammation:
 - a. Features of chronic inflammation.
 - b. Granulomatous inflammation.
- Systemic effects of inflammation.
- Mediators of the inflammatory response.
- Tissue repair:
 - a. Regeneration and fibrosis.
 - b. Healing of skin wound healing.
 - c. Pathologic aspects of repair.

4. Hemodynamic Disorders:

- Hyperemia and congestion; Edema & Hemorrhage.
- Thrombosis: Etiology, pathogenesis, morphology, types, clinical correlation & fat of a thrombus.
- Embolism: Classification & specific types (air, fat & amniotic fluid embolism), pulmonary and systemic thromboembolism.
- Infarction: Types, factors affecting its development & clinical correlation.
- Shock: Classification, pathogenesis & staging.
- Gangrene: causes, classification and types.

5. Pathology of the Immune System:

- Innate immunity & Adaptive immunity.
- Immunologic mechanisms of tissue damage (Hypersensitivity reactions).

- Transplant rejection: hyperacute, acute & chronic rejections.
- Autoimmune diseases: types, an etiology, pathogenesis, clinical features.
- Immunodeficiency disorders: Primary & Secondary.
- Amyloidosis: definition, classification, etiology, clinical correlation.

6. Neoplasia:

- Nomenclature, characteristics of benign and malignant neoplasms, etiology, premalignancy.
- Clinical effects of tumors.
- Pathological diagnosis of tumors.
- Tumor staging and grading.
- Carcinogenesis.

7. Developmental and Genetic Diseases:

- Classification of developmental and genetic diseases.
- Errors of morphogenesis: clinically important malformations.
- Chromosomal abnormalities.
- Single-gene abnormalities.

8. General Pathology of Infectious Diseases:

- Categories of infectious agents.
- Pathogenesis of infectious diseases.
- Inflammatory response to infectious agents.
- Bacterial infection (toxemia, bacteremia, septicemia, pyemias), fungal, parasitic.
- Granuloma: definition, classification; Tuberculosis (causative organism, route of infection, reaction of the body, spread), Syphilis: congenital and acquired type, Leprosy, Actinomycosis, Rhinoscleroma and Bilharziasis.

9. Environmental and Nutritional Diseases:

- Air pollution, tobacco smoke, pneumoconiosis.
- Alcohol and radiation effects and chemical injury (Toxic and nontoxic agent).
- Physical injury (thermal, electrical).
- Protein-energy malnutrition.
- Vitamin deficiencies.
- Obesity.
- Growth disturbance: definition, atrophy, hypertrophy, hyperplasia, hypoplasia, aplasia, agenesis, atresia, metaplasia and dysplasia.

II- Systemic Pathology:

1. Cardiovascular pathology:

- Diseases of arteries:
 - a. Hypertension, arteriosclerosis, atherosclerosis.
 - b. Vasculitis as polyarteritis nodosa, Wegener' granulomatosis Polyangiitis, thromboangitis obliterans, aneurysm.
- Diseases of lymphatics: Lymphangitis and lymphedema.
- Diseases of venous: varicose veins, thrombophlebitis, phlebothrombosis, obstruction of Superior and inferior vena cava.
- Vascular tumors: hemangiomas, glomangioma, angiosarcoma, emangioendothelioma, Kaposi's sarcoma.
- The heart
 - a. Heart failure & ischemic heart disease.
 - b. Endocarditis (bacterial & non-bacterial).
 - c. Rheumatic heart (valvular) disease and Rheumatic fever.
 - d. Cardiomyopathies.
 - e. Myocarditis (infective & non-infective).
 - f. Pericardial effusions & Pericarditis.
- Congenital heart disease: cyanotic & acyanotic congenital heart disease.
- Tumors of the heart and pericardium.

2. Respiratory system:

- Diseases of the upper respiratory tract:
 - a. Allergic rhinitis, nasal, sinuses and paranasal polyps & tumors.
 - b. Laryngeal oedema & tumors as nasopharyngeal carcinoma, laryngeal tumors, non-malignant lesion.
- Diseases of the Lung:
 - a. Atelectasis (collapse).
 - b. Obstructive & Restrictive lung diseases: Asthma, emphysema, chronic bronchitis, bronchiectasis & acute, chronic restrictive diseases.
 - c. Pulmonary infections: Pneumonias: Lobar, Bronchopneumonia & Interstitial pneumonia, primary.
 - d. Pulmonary TB, Fungal infections.
 - e. Occupational lung diseases: coal worker's pneumoconiosis, asbestosis, silicosis, hypersensitivity pneumonitis.
 - f. Pleural lesions: malignant mesothelioma, pleural effusion and pleuritis, hemothorax, chylothorax, pneumothorax.
 - g. vascular Lung diseases: pulmonary thromboembolism, hemorrhage, infarction and vascular sclerosis.
- Tumors of lung.
- Diseases of the pleura: Pneumothorax, Pleural effusions & Tumors.

3. Digestive System:

- Oral cavity: ulcerative and inflammatory lesions & tumors.
- Salivary glands diseases: sialadenitis & tumors.

- Esophagus: anatomic and motor disorders: hiatal hernia, achalasia, diverticula, varices, esophagitis, Barrett esophagus, laceration, Tumors & tumor-like lesions.
- Stomach:
 - a. Gastritis: acute & chronic.
 - b. Gastric ulceration: acute & chronic peptic ulcers.
 - c. Gastric neoplasms & polyps.
- Small and Large intestine:
 - a. Developmental anomalies: congenital mega colon, Hirschsprung disease.
 - b. Vascular disorders: ischemic bowel disease, hemorrhoids and angiodysplasia.
 - c. Malabsorption diseases, diarrhea and dysentery, infectious enterocolitis.
 - d. Idiopathic inflammatory bowel disease: Crohn disease & ulcerative colitis.
 - e. Colonic diverticulosis.
 - f. Bowel obstruction.
 - g. Tumors.
- Appendix: Acute appendicitis, mucocoele & tumors.
- Liver and Biliary system:
 - a. Inflammatory and infectious disorders: acute & chronic hepatitis, autoimmune hepatitis and liver abscesses: general principles (hepatic injury, jaundice, cholestasis bilirubin and bile duct, pathophysiology of jaundice, cholestasis.
 - b. Alcoholic liver disease.
 - c. Intrahepatic biliary tract diseases: Primary biliary cirrhosis & Primary sclerosing cholangitis, impaired blood flow through liver, venous outflow obstruction.
 - d. Metabolic & Inherited diseases: nonalcoholic fatty liver, Wilson's disease, α -antitrypsin deficiency, Hemochromatosis & Reye syndrome, neonatal hepatitis.
 - e. Circulatory disorders: Portal vein obstruction and thrombosis, Portal hypertension, Peliosis Hepatitis & hepatic vein thrombosis.
 - f. Cirrhosis.
 - g. Hepatic failure: hepatic encephalopathy, hepatorenal syndrome.
 - h. Liver Tumors (benign & malignant).
 - i. Gallbladder and Extrahepatic Biliary System: cholelithiasis (bile stones), acute & chronic cholecystitis, Secondary biliary cirrhosis & Tumors (benign, malignant include ampule of Vater), ascending cholangitis, choledocholithiasis, extrahepatic biliary atresia.
- Pancreas: acute and chronic pancreatitis & tumors.
- Insel cell tumor: hyperinsulinism (insulinomas, Zollinger Ellison syndrome).
- Peritoneum: peritonitis and tumors.

4. Urinary System:

- Kidneys:
 - a. Clinical syndromes, acute & chronic renal failure.
 - b. Congenital anomalies.
 - c. Cystic diseases.
 - d. Glomerular diseases: Acute & chronic glomerulonephritis & glomerulopathies.
 - e. Tubulopathies (diseases of the tubules).
 - f. Interstitial nephritis.
 - g. Vascular diseases: arteriosclerosis & arteriolosclerosis.

- h. Tumors (benign & malignant)
- Urinary tract and bladder:
 - a. Congenital anomalies.
 - b. Inflammations: acute & chronic urocystitis.
 - c. Obstructive lesions of the urinary tract.
 - d. Urolithiasis (renal stones).
 - e. Tumors (benign & malignant).

5. Male Reproductive System:

- Testis:
 - a. Cryptorchidism & Testicular Atrophy.
 - b. Inflammations.
 - c. Torsions & varicocele.
 - d. Tumors.
- Prostate:
 - a. Inflammation (prostatitis).
 - b. Prostatic hyperplasia.
 - c. Prostatic carcinoma.
- Penis and scrotum
 - a. Malformation.
 - b. Inflammations.
 - c. Tumors.

6. Female Genital System:

- Vulva, vagina and cervix:
 - a. Inflammations.
 - b. Tumors and tumor-like lesions.
- Body of the uterus:
 - a. Endometritis, adenomyosis, endometriosis, dysfunctional uterine bleeding and endometrial hyperplasia.
 - b. Tumors of endometrium and myometrium.
- Fallopian tubes:
 - a. Inflammation.
 - b. Tumors.
- Ovary:
 - a. Inflammations & cysts.
 - b. Tumors & tumor-like lesions.
 - c. Diseases of pregnancy:
 - d. Placental inflammation, ectopic pregnancy & gestational trophoblastic disease (hydatidiform mole & choriocarcinoma).
- Breast:
 - a. Developmental abnormalities.
 - b. Inflammation & fibrocystic changes.
 - c. Tumors.
 - d. Male breast: Gynecomastia & tumors.

7. Endocrine System:

- Pituitary:
 - a. Hypofunction and hyperfunction.
 - b. Tumors.
- Thyroid:
 - a. Hypofunction, hyperfunction & inflammations.
 - b. Tumors.
- Parathyroid: hypofunction & hyperfunction.
- Adrenal:
 - a. Hypofunction and hyperfunction.
 - b. Tumors.
 - c. Multiple endocrine neoplasia; MEN I & Multiple endocrine neoplasia; MENII.

8. Lymphoreticular System & Bone marrow:

- Lymph nodes:
 - a. Inflammation (acute & chronic).
 - b. Non-Hodgkin's lymphoma & Hodgkin's lymphoma.
- Thymus:
 - a. Thymic enlargement.
 - b. Tumors.
- Spleen: splenic enlargement & hyposplenism.
- Bone marrow:
 - a. Red blood cells disorders (anemias).
 - b. White blood cells disorders (leukemias).

9. Nervous System:

- Congenital malformation.
- Cerebral edema, Hydrocephalus & Herniation.
- Inflammations; meningitis, encephalitis & cerebral abscess.
- Vascular disturbances; Stroke & hemorrhage.
- Demyelinating diseases; multiple sclerosis.
- Degenerative diseases; Alzheimer's disease & Parkinsonism.
- Brain Tumors.
- Peripheral nervous system; inflammation and tumors.

10. Locomotor System:

- The bones:
 - a. Congenital disorders.
 - b. Inflammations; osteomyelitis.
 - c. Metabolic diseases; osteoporosis, rickets, osteomalacia, osteitis fibrosa cystic & Paget's disease of the bone.
 - d. Tumors.
- The joints:
 - a. Inflammations; arthritis, suppurative, rheumatoid and tuberculous & ankylosing spondylitis.

- b. Degenerative conditions; Osteoarthritis.
- c. Metabolic diseases; Gout.
- d. Tumors.
- Skeletal Muscles:
 - a. Muscle atrophy.
 - b. Muscle Dystrophy.
 - c. Myopathy.
 - d. Myasthenia Gravis.
 - e. Tumor.

III- Pathophysiology:

- Introduction to pathophysiology.
- Cardiac Pathophysiology.
- Pulmonary Pathophysiology.
- Musculoskeletal pathophysiology.
- Neurological Pathophysiology.
- Pathophysiology and treatment of fever in adults.
- Development pathophysiology.
- Pathophysiology basics.
- Pathophysiology Concepts Terms.
- Female and Male Reproduction pathophysiology.
- Integumentary System pathophysiology.
- Endocrine System pathophysiology.
- Special Senses pathophysiology.
- CSF Physiology and Pathophysiology of Hydrocephalus.

THE PRACTICAL:

2.5 hours each week for each group to discuss; identify and describe the different microscopic pathological slides (2.5x24 = 60 hours).

The discussion: 2.5 hours each week for each group to discuss; identify and describe the different pathological specimen jars (2.5x24 = 60 hours).

The total of 24 week for each group.

The discussion group 1x24 hours.

PRACTICAL SLIDE SESSIONS:

1-Acute Inflammation:

Slides: 1. acute appendicitis 2. acute salpingitis 3. lobar pneumonia 4. fibrinous pericarditis.

2-Chronic Inflammation:

Slides: 1. chronic cholecystitis 2. chronic gastric peptic ulcer.

3-Cell Injury:

Slides: 1. fatty change of liver 2. Amyloid liver 3. hyalinosis of spleen 4. nodulae hyperplasia of prostate.

4-Circulatory disturbance 1:

Slides: 1. chronic venous congestion of lung 2. chronic venous congestion of liver.

5- Circulatory disturbance 2:

Slides: 1. renal infarction 2. spleen infarction 3. recent thrombus.

6- Granuloma 1:

Slides: 1. T. B in lymph node 2. early T. B in lung 3. chronic fibro caseous tuberculosis lung 4. miliary T.B in spleen.

7- Granuloma 2:

Slides: 1. bilharzial fibrosis of liver 2. actinomycosis 3. bilharzial fibrosis of large intestine.

8. Disorder of growth:

Slides: 1. brown atrophy of heart 2. nodular hyperplasia of prostate.

9. Benign Tumors:

Slides: 1. lipoma 2. myxoma 3. leiomyoma 4. fibroma 5. squamous cell papilloma 6. chondroma 7. fibroadenoma breast.

10. Malignant tumors:

Slides: 1. squamous cell carcinoma 2. basal cell carcinoma 3. Malignant melanoma.

11. Development diseases:

Slides: 1. capillary hemangioma skin 2. cavernous hemangioma 3. cavernous lymphangioma 4. teratoma ovary.

12. Secondaries:

Slide: Secondaries lymph node.

13. C.V.S:

Slides: 1. atheroma aorta 2. myocardial infarction 3. subacute bacteria endocarditis.

14. Respiratory System:

Slides: 1. emphysema 2. Bronchopneumonia 3. lobar pneumonia 4. TB lung.

15. Unitary system:

Slides: 1. renal cell carcinoma 2. Wilms tumor 3. acute diffuse glomerulonephritis 4. chronic glomerulonephritis 5. chronic pyelonephritis.

16. Male genital system:

Slides: 1. seminoma testis 2. nodular hyperplasia of prostate.

17. Digestive system:

Slides: 1. benign mixed salivary tumors 2. adenocarcinoma of colon 3. chronic gastric peptic ulcer.

18. Female genital system:

Slides: 1. vesicular mole 2. adenomyosis 3. endometrial hyperplasia 4. mucinous cystadenoma ovary.

19. Breast:

Slides: 1. fibroadenoma breast 2. fibrocystic disease of breast 3. cancer breast.

20. Endocrine system:

Slide: colloid goiter.

21. Liver and biliary system:

Slides: 1. pigment cirrhosis 2. biliary cirrhosis 3. bilharzial fibrosis liver 4. hepatocellular carcinoma.

22. Blood and lymphatic system:

Slides: 1. Hodgkins's disease lymph node 2. chronic lymphatic leukemia liver.

23. Bone:

Slides: 1. osteoclastoma 2. osteosarcoma.

24. C.N.S:

Slides: 1. glioblastoma multiforme.

DISCUSSION AND JARS:**1. Acute Inflammation:**

Jars: acute appendicitis, fibrinous pericarditis, bacillary colitis.

2. Chronic inflammation:

Jars: chronic peptic ulcer, chronic cholecystitis, chronic lung abscess.

3. Cell injury:

Jars: fatty change of liver, amyloidosis of liver, TB kidney, pigment cirrhosis of liver, brown atrophy of heart, spleen infarction.

4. Circulatory disturbance 1:

Jars: thrombosis in leg veins, infective endocarditis, aneurysm of renal artery, C.V.C kidney, C.V.C spleen, C.V.C liver.

5. Circulatory disturbance 2:

Jars: spleen infarction, lung infarction, kidney infarction, adrenal gland hemorrhage, cerebral hemorrhage, senile and diabetic gangrene.

6. Granuloma 1:

Jars: T.B lung, lymph node, spleen, brain, peritoneum, kidney, liver, spleen, intestine, meningitis.

7. Granuloma 2:

Jars: bilharzial fibrosis of liver, bilharzial spleen, bilharzial fibrosis of large intestine.

8. Disorder of growth:

Jars: brown atrophy of heart, hypertrophy urinary bladder, left ventricular hypertrophy.

9. Benign Tumors:

Jars: lipoma, myxoma, fibroma, osteoma, familial polyposis, chondroma, fibroadenoma breast, mucinous cyst adenoma, serous cyst adenoma.

10. Carcinoma:

Jars: cancer stomach, cancer colon, mucinous cystadenocarcinoma, papillary serous cystadenocarcinoma, basal cell carcinoma, ca. breast, squamous cell carcinoma.

11. Sarcoma:

Jars: leiomyosarcoma, liposarcoma, sarcoma breast.

12. Developmental tumors:

Jars: nephroblastoma, retinoblastoma, neuroblastoma, hepatoblastoma, medulloblastoma, hamartoma liver, cystic lymphangioma.

13. Secondaries:

Jars: liver secondaries, bone, skull, lung, lymph node secondaries.

14. C.V.S:

Jars: rheumatic endocarditis and myocarditis, acute bacterial endocarditis, fibrinous pericarditis, calcified mitral stenosis with thrombus in left atrium, mitral stenosis and ball thrombus with subacute bacterial endocarditis and aortic stenosis, recent myocardial infarction with rupture, and coronary atherosclerosis, left ventricular hypertrophy, atherosclerosis with ulceration and calcification, thrombus in the leg vein, renal artery aneurism with thrombus in aneurismal sac.

15. Urinary system and male genital system:

Jars: congenital polycystic kidney of infantile type, congenital polycystic kidney an adult, acute diffuse glomerulonephritis, focal glomerulonephritis, tuberculosis kidney, hydronephrosis, calculous pyonephrosis, pyonephrosis and pyoureter, multiple abscesses of kidney, chronic venous congestion kidney, old (healed) multiple infarctions of kidney and spleen, Wilms tumor, renal cell carcinoma, urinary bladder carcinoma, chronic cystitis with two phosphate stone.

16. Male genital system:

Jars: senile prostate and dilated hypertrophy urinary bladder, senile prostate, seminoma testis, teratoma testis, orchidoblastoma.

17. Respiratory system:

Jars: carcinoma larynx, lobar pneumonia (gray hepatization), lung abscess, bronchopneumonia, hemorrhagic, infarction TB lung with cavity, chronic fibro caseous pulmonary tuberculosis with bronchopneumonia, military TB lung, bronchiectasis, emphysema lung, bronchogenic carcinoma with metastasis to mediastinal lymph node, lung metastasis to mediastinal lymph node, lung secondaries, cannonball secondary in lung.

18. Digestive system:

Jars: congenital esophageal atresia with trachea-esophageal fistula, infiltration carcinoma with secondaries in lymph node, malignant ulcer of the stomach, diffuse

infiltration carcinoma of stomach, Meckel's diverticulum, typhoid enteritis with ulceration, strangulated ileum with gangrene, volvulus of small intestinal with gangrene, ileo-cecal intussusception, malignant lymphoma, malignant lymphoma of Ileo-caeca junction, ulcerative carcinoma of large intestine, polypoid carcinoma colon, Acute suppurative appendicitis, Crohn's disease of caecum, ulcerative carcinoma of large intestine, chronic ulcerative colitis, military TB peritoneum, bilharzial polyps in large intestine, amoebic ulcers of ileo-cecal region, multiple familial polyposis of colon, acute suppurative appendicitis, Crohn's disease of caecum.

19. Liver and gall bladder:

Jars: portal cirrhosis, macronodular cirrhosis, biliary cirrhosis, hemochromatosis liver, bilharzial fibrosis of liver, portal cirrhosis with hepatoma, hamartoma liver, hepatoblastoma, chronic cholecystitis with two cholesterol stone, chronic cholecystitis with mixed stone, pancreatic adenoma.

20. Female genital system and breast:

Jars: invasive carcinoma cervix, subserous leiomyoma, multiple leiomyomata, adenomyosis uterus, simple serous cyst, mucinous cystadenoma, dermoid cyst ovary, vesicular mole, choriocarcinoma, papillary cystadenocarcinoma, fibroadenoma breast, carcinoma breast.

21. Blood and lymphatic system:

Jars: TB-lymphadenitis of mediastinal nodes, Hodgkins's disease of spleen and lymph node chronic venous congestion diseases and gamma glandil bodies.

22. Bone:

Jars: chronic osteomyelitis, osteoma, chondroma, osteosarcoma, multiple myeloma of vertebral column, secondaries in spine, secondaries in skull, rickety chest, ricket's, humerus and femur, sequestrum.

23. C.N.S:

Jars: congenital hydrocephalus, cerebral hemorrhage, tuberculoma of basal ganglia, tuberculous meningitis, medulloblastoma, glioblastoma of pons, gas gangrene, astrocytoma midbrain.

24. Endocrine system:

Jars: colloid nodular goiter, carcinoma thyroid, pheochromocytoma, adrenal gland hemorrhage, neuroblastoma.

REFERENCES:**Essential Books:**

- Basic Pathology; Kumar, Cotran & Robbins.

Recommended Books:

- General pathology; Walter & Israel.
- Pathology Illustrated
- Atlas of Histopathology.

Web Sites:

- [http:// www. PATHMAX. Com](http://www.PATHMAX.Com)
- [http://:www.library.med.utah.edu/webpath](http://www.library.med.utah.edu/webpath)

PHARMACOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Pharmacology	120	100	50	270

Objectives of Course:

- To help the students for clear understanding the basic knowledge about commonly used groups of drugs, pharmacokinetics, mode of actions, pharmacological actions, and their therapeutic applications in various diseases.
- To assure full understanding safe usage through learning their adverse effects including toxicity, contraindications and drug interactions.

Practical Objectives:

- Practical experimental skills mainly on animals in vivo and in vitro (observe, record and analyze the effect of drugs on biological tissues) with illustration of different techniques of drug administration.
- Write a prescription for selected important diseases.
- Audit prescriptions citing multiple drugs.

Learning outcomes:

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

- Discuss the pharmacokinetics, pharmacodynamics and pharmacotherapeutics of different groups of drugs.
- Sound awareness about the adverse effects including acute and chronic toxicity of commonly used groups, and their management.
- Full awareness of limitations to the use of drugs such as contraindications and drug interactions.
- Awareness about variations during drug application with regard age, sex and genetic related variations that affect response to drugs.
- Good understanding the mechanism of action of drugs with regard pathophysiology of diseases which is essential for further proper choice of drugs.
- Discuss the impact of preventive pharmacology in prevent illness.
- Discuss the role, prevalence and limitations of alternative and complementary therapies commonly in use.
- Discuss the principles and possible applications of gene therapy.
- Define the basis of pharmaco-economics.

SYLLABUS:

1. Introduction.

2. General pharmacology:

- Pharmacodynamics.
- Pharmacokinetics.

3. Autonomic Nervous System:

- Physiological aspects.
- Cholinergic system: Parasympathomimetic & Parasympatholytic.
- Adrenergic system: sympathomimetic, adrenergic antagonists, adrenergic neuron blockers, ergot alkaloids.
- Drugs acting on autoimmune ganglia
- Drug acting on skeletal muscle motor end plate: skeletal muscle stimulants, skeletal muscle relaxants.

4. Autacoids:

- Histamine & antihistamines.
- Prostaglandins & kinins.
- Platelet activating factor.
- Angiotensin, antagonist and angiotensin-converting enzyme inhibitors.
- 5-hydroxytryptamine, 5-HT-receptor antagonist.
- Eicosanoids (Prostaglandins, prostacyclin, Thromboxane, leukotrienes), antagonist
- Nonsteroid anti-inflammatory drugs and drugs used in Gout.

5. Central Nervous System:

- General anesthesia and pre-anesthesia.
- Sedatives Hepaticas and Alcohol.
- Narcotic Analgesics.
- Antipyretic analgesics, Anti-inflammatory agents & Gout.
- Antiparkinsonism drugs.
- Anti-epileptics.
- Psychopharmacology; Neuroleptics, Antidepressants, Drug treatment of mania, antipsychotic.
- Psychomimetic: Drugs of abuse and dependence.
- Sedative –hypnotics, antianxiety drugs.
- C.N.S. stimulants, hallucinogenic agents, Drugs of abuse and dependence.
- Local Anesthetics.

6. Pharmacology of GIT:

- Physiology of diuresis.
- Drugs used in Diabetes insipidus.
- Emetics, anti-emetics, laxatives, antidiarrheal agents, anorexigenics, drug treatment of peptic ulcer & diuretics.
- Appetite suppressants, prokinetics, digestant.

7. Haemopoietic System:

- Iron, Vitamin B12, Folates.
- Coagulants, Anticoagulant.
- Thrombolytics.
- Erythropoietin.
- Hypolipidemic agent.

8. Cardiovascular System:

- Cardio tonics.
- Antiarrhythmic agents.

- Antianginal drugs.
- Antihypertensive agents.
- Digitalis glycosides & other drugs used in congestive heart failure.

9. Respiratory System:

- Pharmacology of oxygen.
- Bronchodilators, Antitussives & Expectorants, cough suppressant.

10. Endocrine System:

- Pituitary hormones.
- Thyroid hormones.
- Parathyroid hormone & Vitamin D.
- Hypoglycemic agent.
- Corticosteroids.
- Sex hormones & Oral Contraceptives.
- Pancreatic hormones.

11. Chemotherapy:

- Penicillin, Cephalosporins, other β -lactam antibiotics.
- Aminoglycoside Antibiotics.
- Marched Antibiotics.
- Broad Spectrum Antibiotics, Erythromycin, tetracycline, chloramphenicol.
- Sulphonamides, Trimethoprim.
- Quinolones.
- Urinary antiseptics.
- Drug treatment of TB and leprosy.
- Antiviral & antifungal agents.
- Antimalarials.
- Antiemetics & Protozoal infections.
- Anthelminthics.

12. Miscellaneous topics:

- Pharmacogenetics.
- Drugs therapy during pregnancy, lactation, infancy and childhood.
- Drugs acting on uterus.
- Immunosuppressants, Immunostimulants, Immunization.
- Antiseptics & Disinfectants.
- Cancer Chemotherapy.
- Cheating Agents.
- Drug Interactions.

13. Clinical Cases:

- Peptic ulcer.
- Anemia.
- Heart failure.
- Hyper/ hypothyroidism.
- Hypertension.
- Bronchial asthma.

14. Toxicology:

- Air pollutants.
- Solvents.
- Insecticides and Herbicides.
- Fumigants and Rodenticides.
- Heavy metal poisoning.
- Drug poisoning.
- General management of the poisoned patient.

PRACTICAL:

A course of 20 practical classes of 2 hours each includes the following:

1. Experimental pharmacology:

- Handling of experimental animals and routes of drug administration.
- Preparation of physiological solutions in experimental pharmacology and drug dose calculation.
- Routes of drug excretion.
- Hepatic microsomal enzyme induction and inhibition in albino rats.
- Effects of drug on rabbit eye.
- Effects of drug on isolated rabbit jejunum.
- Dose-response relationship, Guinea-pig ileum.
- Drug prevention of experimentally induced convulsions in albino rats.
- Effects of drug on experimentally induced Parkinsonism in mice and rats.
- Effects of drug on Langendorff's isolated rabbit heart.
- Potentiation of infiltration anesthesia by adrenaline in Guinea pigs.
- Analgesic and anti-inflammatory activities of narcotic analgesics and Nonsteroidal anti-inflammatory drugs on paw oedema and thermal hot Plate models in rats and mice respectively.

2. Clinical pharmacology:

- Drugs dosage forms.
- Prescription writing.
- Clinical pharmacology of anemias.
- Clinical pharmacology of peptic ulcer.
- Clinical pharmacology of hypertension.
- Clinical pharmacology of congestive heart failure.
- Clinical pharmacology of diabetes mellitus.

REFERENCES:

1. B.G, Katzung. Basic & clinical Pharmacology.
2. Pharmacology Lippincott illustrated reviews.

MICROBIOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Microbiology and Immunology	100	80	30	210

Objectives of Course:

- Enabling students to learn the basic concepts of microbiology: bacterial, viral and fungal morphology, metabolism, physiology, genetics, and induced diseases, especially endemic in the locality: their transmission, laboratory diagnosis, treatment, prophylaxis and control in vivo and in vitro and molecular biology.
- It also aimed at helping the students know and understand the effect of different antimicrobial agents on each organism as well.
- Provide students with the essential knowledge of the structure and function of the immune system, mechanism of immunity and immune mediated diseases as well as the different methods used to diagnose and control such diseases.
- One of the targets of this course is to make students aware of the different nosocomial infections and their mode of transmission and to familiarize students with the different principles and measures of infection prevention and control.

Practical Objectives:

- Microscopic stained preparations of the most medically important bacteria, also identify culture media (with and without growth), and the different biochemical and serological tests and antibiograms used to identify bacteria and diagnose the disease.
- They must be able to perform: Simple stain, Gram stain and Zeihl-Neelsen stain of bacteria.
- Students should know how to practice the basic infection control measures as hand wash, use of different methods of sterilization and disinfection.

Learning outcomes:

- General (bacterial, viral, fungal) morphology, physiology and genetics.
- The principles of growing and cultivating microorganisms and the scientific basis of using antimicrobial agents, their mode of action, application and complications in vivo and in vitro.
- The host parasite relationship and microbial virulence and pathogenesis.
- The immune system, its structure, normal function, beneficial and harmful or deleterious behavior or reactions (Immunopathology).
- Microorganisms of medical importance with emphasis on: morphology, culture, antigenic structure, virulence, pathogenesis, clinical diseases they caused, diagnosis, treatment, prevention and control.
- Nosocomial infections, principles and methods of decontamination and infection prevention and control.
- The clinical manifestations of systemic infections and different organisms causing them, and how to reach a diagnosis.
- Basis of molecular biology.

SYLLABUS:**• General Microbiology:**

- Introduction to medical microbiology.
- Morphology and structure of microorganisms (bacteria-viruses and fungi):
 - Difference between Eukaryotic and Prokaryotic cells.
 - Basic bacterial structure.
 - Methods of microorganism staining.
 - Structure of viruses and fungi.
- Classifications of microorganisms.
- General characteristics of disease.
- Microbial physiology.
- Sterilization and disaffection:
 - Methods of sterilization.
 - Methods of disaffection & Antiseptics.
- Bacteriophages; nature, replication and importance, growth requirement for bacteria & bacteria growth cycle.
- Principles of bacterial genetics:
 - Bacterial chromosomes.
 - Variation; mutation, genetic transfer between bacteria i.e., transformation, transduction & conjugation.
 - Genetic engineering.
- Plasmids and drug resistance.
- Antimicrobial chemotherapy: Mechanism, drug resistance & antibiotic policies.

• Immunology:

- Medical importance of immunology.
 - Anatomy, function and cells of immune system.
- Natural & Acquired Immunity:
 - Natural Immunity: physical barriers, chemical barriers, phagocytosis.
 - Acquired Immunity: lymphocytes, antigen presenting cell.
- Antigens and antibodies:
 - Antigen, haptens, adjuvants & antigenic determinants.
 - Immunoglobulins (structure, classes, characteristics, functions, antigen-antibody reaction).
- Antigen - antibody reactions and their dictation:
 - In vivo: protection against pathogenic organisms.
 - In vitro: precipitation, agglutination, hemagglutination, immunoelectrophoresis, class test etc.
- The immune response:
 - Humoral response.
 - Cell-mediated response.
 - Cells involved in the immune response.
 - Factors affecting the immune response.
 - Primary & secondary immune response.
- The complement system:
 - Definition, Opsonization.
 - Activation: Classical and alternative pathways.
 - Control of complement activation.

- o Mechanism and functions of complement.
- o Complement and diseases.
- Red cell antigens and antibodies & their interactions:
 - o Definition, distribution & important.
 - o The ABO system (chemistry and genetics).
 - o The Rh antigens and hemolytic disease of the newborn.
 - o Blood transfusion reactions.
 - o Other blood group systems.
- Hypersensitivity reactions:
 - o Mechanism.
 - o Classification: type I, II, III (antibody mediated) & type IV (cell- mediated).
 - o Anaphylaxis, atrophy & cytotoxic reactions.
 - o Allergies of infections & contact dermatitis.
- Immunology of transplantation:
 - o Types of grafts.
 - o Allograft reaction and mechanism.
 - o Graft versus host reaction.
 - o Histocompatibility antigens.
 - o MLR, suppression of allograft reaction.
 - o Tolerance.
- Tumor immunology:
 - o Evidence of tumor immunity.
 - o Tumor specific antigen.
 - o Once - fetal antigen.
 - o Tumor rejection.
- Autoimmune diseases:
 - o Mechanisms, hidden antigens, glomerulonephritis.
 - o Uveitis, Microorganisms modification of antigens.
 - o Post measles encephalomyelitis.
 - o Cross reacting antigens (rheumatic fever).
- Primary and secondary defects.
- Infection and immunity.

- **Systematic Microbiology:**

I. SYSTEMIC BACTERIOLOGY:

Pyogenic cocci: Gram positive (Staphylococci and Streptococci) and Gram negative (Neisseria).

- **Staphylococcus species** (Staph. aureus, Staph epidermidis, Staph. saprophyticus): General characteristics, natural habitat, classification, virulence factors, pathogenesis, clinical manifestation, mode of infection, epidemiology, laboratory diagnosis, treatment and prevention.
- **Streptococcus species** (Strep. pyogenes, Strep. agalactiae, Strep. pneumonia, viridans streptococci, Enterococcus species): Classification, virulence factors, clinical diseases, laboratory diagnosis, treatment and prevention.
- **Neisseria species:** General characteristics, virulence factors, route of transmission, clinical manifestation, laboratory diagnosis, treatment.

Spore-Forming Gram-Positive Bacilli: *Bacillus* & *Clostridium* species

- **Bacillus species** (*B. anthracis*, *B. cereus*): General characteristics, natural habitat, classification, virulence factors, pathogenesis, clinical manifestation, mode of infection, epidemiology, laboratory diagnosis, treatment and prevention
- **Clostridium species** (*Cl. perfringens*, *Cl. tetani*, *Cl. botulinum* & *Cl. difficile*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, mode of infection, epidemiology, laboratory diagnosis, treatment and prevention

Mycobacteria

- *Mycobacterium tuberculosis* & *Mycobacterium leprae*: General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- Other *Mycobacterium* species

Non-Spore-Forming Gram-Positive Bacilli

- ***Corynebacterium diphtheriae***: General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- Other Coryneform Bacteria.
- ***Listeria monocytogenes***: General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- ***Actinomycetes* species** (*A. israelii*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- ***Nocardia* species** (*N. asteroides*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

Enteric Gram-Negative Rods (Enterobacteriaceae)

- *Escherichia coli*, *Salmonella* serotypes and *Shigella* species, *Klebsiella* species, *Citrobacter*, *Serratia*, *Proteus* and *Enterobacter*:
- General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

Enteric Gram-Negative Rods (non-Enterobacteriaceae)

- ***Pseudomonas aeruginosa* and *Acinetobacter* species**: General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- ***Vibrios*** (*Vibrio cholerae*, *V. parahaemolyticus*): General characteristics, Taxonomy, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- ***Yersinia* species** (*Y. pestis*, *Y. enterocolitidis*): General characteristics, taxonomy, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- ***Campylobacter* species and *Helicobacter pylori***: General characteristics, classification, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention

Haemophilus, Brucella, Bordetella & Legionella. (Fastidious bacteria)

- **Haemophilus species** (*H. influenzae*, *H. parainfluenza*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Bordetella** (*Bordetella pertussis*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Brucellae** (*Br. Melitensis*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Legionella pneumophila**: General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

Spirochetes & Other Spiral Microorganisms

- **Treponema pallidum**: General characteristics, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Borrelia species** (*B. Burgdorferi*, *recurrentis*): General characteristics, natural habitat, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Leptospira species** (*L. interrogans*, *L. biflexa*): General characteristics, natural habitat, transmission, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

Intracellular bacteria

- **Rickettsia species** (*Rickettsia rickettsiae*, *Rickettsia prowazekii*, *Rickettsia typhi* and *Coxiella burnetii*): General characteristics, natural habitat, transmission, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- **Chlamydia species** (*Chlamydia trachomatis*, *Chlamydophila pneumonia* and *Chlamydophila psittaci*): General characteristics, natural habitat, transmission, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

Cell wall deficient bacteria

- *Mycoplasma pneumoniae*: General characteristics, natural habitat, transmission, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.

OTHER TOPICS

- Anaerobic infections (*Fusobacterium*, *Prevotella*, and *Bacteroides*): General characteristics, natural habitat, transmission, virulence factors, pathogenesis, clinical manifestation, epidemiology, laboratory diagnosis, treatment and prevention.
- Nosocomial infection

II. SYSTEMIC VIROLOGY

The classification, genomic structure, clinical features, replication, pathogenesis, laboratory diagnosis, treatment, vaccines, epidemiology, prevention and control are included in all families for the following viruses

DNA Enveloped Viruses:

- **Herpesviridae**—herpes simplex viruses (cold sores, genital herpes, encephalitis, etc.), varicella-zoster virus (chicken pox, shingles, etc.), Cytomegaloviruses (congenital disorders), Epstein-Barr virus (mononucleosis, Burkitt's lymphoma)
- **Poxviridae**—variola virus (smallpox), Molluscipoxvirus (molluscum contagiosum)

DNA nonenveloped Viruses:

- **Adenoviridae** (Adenoviruses (pharyngitis, conjunctivitis, cold-like infections, gastroenteritis, pneumonia, acute respiratory tract disease, etc.)
- **Polyomaviridae** [BK virus (cystitis), JC virus (PML)]

Papillomaviridae (Human papilloma viruses) (warts, benign tumors, cervical cancer)

Parvoviridae - B19 (fifth disease, aplastic crisis).

Hepatitis viruses:

- Hepatitis A, B, C, D viruses

Enveloped Segmented Single-stranded RNA Viruses: Orthomyxoviruses (Influenza viruses (influenza, other respiratory infections

Enveloped Non-segmented Single-stranded RNA Viruses:

- **Paramyxoviridae** [Parainfluenza viruses (cold-like diseases, croup), mumps virus (mumps), measles virus (measles), respiratory syncytial virus (colds, bronchitis)]
- **Coronaviridae** [Coronaviruses (common colds, *severe acute respiratory syndrome (SARS)*, Coronavirus disease 2019 (COVID-19)]

Picornaviridae [Rhinoviruses (common colds), polioviruses (polio), Coxsackie viruses (meningitis, encephalitis, myocarditis, pericarditis, cold-like diseases, conjunctivitis), echoviruses (meningitis, encephalitis, exanthems, myocarditis, pericarditis)

Togaviridae [Rubivirus (Rubella/ German Measles) (acquired rubella and congenital Rubella syndrome)]

Rhabdoviruses (rabies virus, vesicular stomatitis virus)

Reoviridae: Rotaviruses (gastroenteritis)

Caliciviruses Norwalk virus (gastroenteritis)

Astroviruses (gastroenteritis)

Arthropod- borne viruses

- **Togaviridae** [various encephalitis viruses (flulike disease, encephalitis)]
- **Flaviviridae** [flaviviruses (encephalitis, dengue hemorrhagic fever, yellow fever, west Nile fever, Zika fever.)]
- **Bunyaviridae** [various encephalitis viruses, phleboviruses & nairoviruses (hemorrhagic fevers, encephalitis)]

Miscellaneous Viruses

- **Filoviridae** [Ebola & Marburg viruses (hemorrhagic fevers)]
- **Hantaviruses** (Hantavirus pulmonary syndrome.):
- **Arenaviruses** (Lassa fever, Lymphocytic choriomeningitis)

Retroviridae [HIV (AIDS), HTLV (adult acute T-cell lymphocytic leukemia)]

Tumor viruses & Slow viruses

III. MEDICAL MYCOLOGY:

Medical important fungi and associated diseases

- **Mycotoxicoeses:** mycotoxin and associated diseases.
- **Fungal hypersensitivity.**
- **Disease of fungi:** colonization, diseases, host immunity to fungal diseases, classification of fungal diseases.
- **Superficial mycoses:** general characteristics, causative agents, disease, laboratory diagnosis and treatment.
- **Cutaneous Mycoses (Dermatophytes):** general features, natural habitat, clinical classification and transmission, diagnosis and treatment
- **Subcutaneous Mycoses** (sporothricoses, chromoblastomycoses, eumycetoma): general characteristics, disease, pathogens, clinical symptoms, laboratory diagnosis and treatment.
- **Systemic Mycoses** (*Histoplasma capsulatum*, *Blastomyces dermatitidis*, *Paracoccidioides brasiliensis*, *Coccidioides immitis*): general characteristics, disease pathogens, clinical symptoms, diagnoses and treatment)
- **Opportunistic Mycoses:** general characteristic, predisposing factors, Candidiosis, Cryptococcosis, Aspergillosis and Zygomycoses (clinical diseases, agents, diagnosis and treatment.

B- LABORATORY:

Identification of staphylococci: catalase test, endo-pigment, coagulase test, hemolytic activity on blood agar, mannitol fermentation, & novobiocin sensitivity test.

Identification of streptococci: hemolytic activity on blood agar, Lancefield grouping, bacitracin sensitivity test, optochin sensitivity test & bile- esculin test.

Identification of *Enterobacteriaceae*: oxidase test, growth on MacConkey agar, indole test, citrate test, methyl red test, carbohydrate fermentation test & API 20E test system.

Identification of non-lactose fermenter members (*Proteus* species, *Salmonella* serotypes, *Shigella* species): urease test, hydrogen sulfide test & triple sugar-iron agar test.

Identification of *Mycobacterium tuberculosis*: Ziehl–Neelsen Method (acid fast staining).

Identification of *Vibrio*: oxidase test & growth on TCBS agar.

Identification of *Pseudomonas*:

Oxidase test, pyocyanin pigment & hemolytic activity on blood agar

Virology laboratory: Immunofluorescence assay (IFA) (direct & Indirect), Electron microscope, western blot application, detection of viral proteins (SDS-PAGE & western blot), cultivation of virus (tissue culture, embryonated egg, laboratory animal), injection of embryonated egg and live animals.

Mycology laboratory: culture of fungi, identification of dermatophytes, colonial characteristics, direct microscopic examination, identification of yeast with medical important and identification of aspergillus and zygomycosis.

C-TUTORIALS AND MICROBIOLOGY CASES:

- Staphylococcal infections
- Streptococcal infections

- Infections caused by *Enterobacteriaceae*
- Tuberculosis
- Hospital acquired infections
- Virology
- Mycology

REFERENCES:

1. Murray, P. R., Rosenthal, K. S., & Pfaller, M. A. (2013). Medical microbiology. Philadelphia: Elsevier/Saunders.
2. Brooks, G. F., Jawetz, E., Melnick, J. L., & Adelberg, E. A. (2010). Jawetz, Melnick, & Adelberg's medical microbiology. New York: McGraw Hill Medical.

PARASITOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Total
Parasitology	40	50	20	110

Course Objectives:

- To supply the students with knowledge concerning biological, epidemiological and ecological aspects of parasites causing diseases to humans.
- To make the students fully aware of the pathogenesis, clinical presentations and complications of these parasitic infections.
- To enable the students to select the diagnostic methods in order to reach the final proper diagnosis.
- To enable the students to know the general outline of treatment, the best drug of choice, prevention and control of parasitic diseases.
- To provide the students with fairly good knowledge about endemic parasitic problems and their impact upon health.

Practical Objectives:

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

- Identify parasites and their different stages (eggs, cysts, larvae, trophozoites) or any of their body parts (segment, hooks, scolices) through examination of mounted slides.
- Identify some parasites or their stages (e.g. hydatid) by naked eye (jars).
- Identify arthropods of medical interest through examination of whole body or any part (in boxes or mounted slide).

Learning outcomes:

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

- Describe various aspects of parasites of medical importance (Geographical distribution, morphology and life cycle).
- Understand how the knowledge of these previous aspects could help in causation, propagation and maintenance of each parasitic infection in man and his environment.
- Describe the pathogenesis of parasitic infections and relate the stage of the life cycle to its pathogenesis and clinical signs and symptoms.
- Describe different clinical manifestations of parasitic diseases.
- Describe the conventional and up to date procedures needed to carry out accurate diagnosis of common parasitic disease.
- Outline the effective therapeutic measures of parasitic infection and also give sound advice in prevention and control measures.
- Describe common arthropods of medical interest and explain their medical importance and methods of combat.

Student Assessment Methods:

- Written examination to assess knowledge and understanding and intellectual skills.
- Oral examination to assess knowledge and understanding, attitude and general skills.
- Practical examination to assess practical skills in diagnosis of different parasites.
- Practical notebook to assess attendance and evaluation of understanding.

SYLLABUS:**I. Introduction:**

human parasitism, its classification, terminology and point of practical value.

II. Helminthology:**A. Trematodes:**

- Fasciola hepatica & F. gigantica.
- Heterophyes heterophyes.
- Paragonimus westermani.
- Schistosoma mansoni.
- Schistosoma haematobium.
- Schistosoma japonicum.
- Fasciolopsis buski.
- Clonorchis sinensis.
- Opisthorchis.
- General comparison between life cycles of flukes.
- Snail vectors and their control.

B. Cestodes:**1. Intestinal Cestodes:**

- Diphyllbothrium latum.
- Taenia saginata & T. solium.
- Hymenolepis nana & H. diminuta.
- Dipylidium caninum.

2. Tissue Cestodes:

- Sparganosis & Cysticercosis.
- Hydatid disease & Coenurosis.

C. Nematodes:**1. Intestinal Nematodes:**

- Enterobius vermicularis.
- Trichuris trichiura.
- Ascaris lumbricoides.
- Ancylostoma duodenale & Necator americanus.
- Trichostrongylus colubriformis.
- Strongyloides stercoralis.
- Toxocara canis & visceral larva migrans.
- Ancylostoma caninum & cutaneous larva migrans.
- Trichinella spiralis.
- Stoll & Baerman techniques.
- Haemonchus.

2. Tissue Nematodes:

- Wuchereria bancrofti, Brugia malayi & Brugia timori
- Loa loa.
- Onchocerca volvulus.
- Mansonella perstans, M. ozzardi & M. streptocerca.
- Dirofilaria immitis, D. repens & Angiostrongylus.
- Dracunculus medinensis & Onchocerca volvulus.
- Capillaria hepatica, C. philipinensis & Anisakis.

III. Protozoology:

Definition, diagnosis morphology, biology, with its medical significance and classification of pathogenic protozoa, based on their systematic position and final habitat in human body.

1. Intestinal Protozoa:

- Entamoeba histolytica.
- Entamoeba. Coli, Iodamoeba, Endolimax nana.
- Entamoeba gingivalis.
- Dientamoeba fragilis.
- Balantidium coli.
- Cryptosporidium & Isospora.

2. Free-living extra-intestinal amoebae:

- Naegleria fowleri.
- Acanthamoeba castellani.

3. Intestinal & Urogenital Flagellate Protozoa:

- Giardia lamblia.
- Trichomonas vaginalis.

4. Blood & Tissue Protozoa:

- Cutaneous Leishmania; L. Tropica, L. major, L. aethiopica & L. Mexicana.
- Mucocutaneous L.; L. brasiliensis.
- Visceral L.; L. donovani, L. infantum, L. chagasi.
- African Trypanosoma; T. gambiense & T. rhodesiense.
- American Trypanosoma; T. cruzi.
- Toxoplasma gondii.
- Malaria; Plasmodium vivax, P. ovale, P. malariae & P. falciparum.
- Babesia spp & pneumocystis carinii.

IV. Medical Entomology:

- Introduction to arthropods & vector role.
- Classification of arthropods as causative agents of diseases and transmission of pathology.
- Biomedical importance of arthropods and different modes of transmission of pathology.
- Anoplura; Pediculus humanus capitis, P. h. corporis & Phthirus pubis.
- Hemiptera; Cimex lectularius & Triatomid bug.
- Siphonaptera; Pulex, Ctenocephalides, Nosopsyllus, Xenopsylla & Tunga penetrans.
- Mosquitoes; Anopheles, Culex & Aedes.
- Blood-sucking flies; Phlebotomus, Simulium, Chrysops & Culicoides.
- Musca Stomoxys, Glossina.
- Myiasis & myiasis-producing flies.
- Ticks; Hard & Soft.
- Mites; Sarcoptes, Demodex & Trombicula akamushi.
- Scorpion, Spiders & Cyclops.
- Vector control & insecticides.

V. Miscellaneous:

- Diagnostic parasitological techniques.
- Immunity in parasitic diseases.

LABORATORY STUDIES:

The students will be required to the representative slides including histopathological preparations and museum specimens pertaining to parasite material provided to them during the laboratory hours.

They shall also be required to be well rested with the standard laboratory techniques concerning diagnosis of parasitic infection.

Study of these may also be supplemented with videocassettes exhibitions and micro projections and microphotographs.

The practical and oral examination will be based on all such material and exhibits provided to the students during the laboratory hours and discussion periods.

REFERENCES:**Course books:**

- Basic Clinical Parasitology; Brown & Neva.
- Medical Parasitology; Markell, Voge & John.

Supplementary books:

- Tropical Medicine: Hunter et al.
- A Color Atlas of Tropical Medicine & Parasitology; Peters & Gilles.
- A Color Atlas of Clinical Parasitology; Tomio Yamguchi.

THIRD STAGE**FOURTH MEDICAL YEAR****FAMILY & COMMUNITY MEDICINE**

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Community Medicine	105	50	46	140	341

Course Objectives:

The objectives of the course are:

- Prepare a community-oriented physician capable of implementing preventive, promotive and curative measures for common communicable and non-communicable diseases on the individual, family and community levels and within the primary health care (PHC) settings following MOHP policies and protocols.
- Develop a graduate who is aware about the potential emerging/ re-emerging, endemic and threatening diseases and who can act as the first line of defense and management.
- Prepare a community-oriented physician capable of anticipating and responding to community health needs and demands within the primary health care (PHC) setting according to the policies, regulations and guidelines of the Ministry of Health and Population (MOHP).
- Develop a graduate who will apply the knowledge and skills learned, and is able to take leadership in motivating the community served.

Professional and Practical Objectives:

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

- Anticipate and participate in investigation of an epidemic /outbreak as a part of health team and design an epidemiologic study to address a question of interest.
- Identify trends in health and disease including epidemiological causes of high prevalence of certain infections, causes of eradication, emerging or reemerging previous infections worldwide and in Libya.
- Identify the infectious cycle for selected diseases and apply appropriate health promotion, disease prevention and control measures to identified priority communicable diseases and under specific situations.
- Data acquisition: By the end of the program, the students should be able to conduct, document and analyze a comprehensive situation analysis recognizing non biological factors that may influence disease causation/ management, client's perception of health/ disease, access to care and adequately respond to these factors in the benefit of the client, patient & community.
- Participate in health promotion, disease prevention and national health care programs applying MOHP standards and protocols for different settings, different age groups particularly of the vulnerable groups.

Learning Outcomes:

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

- Explain the basic terms and methods used in infectious disease epidemiology, disease prevention and control trials, outbreak investigation, and evaluation of screening tests.
- Define epidemiologic approaches of disease occurrence in communities: determinants, distribution and dynamics including prevention and control.
- Describe the MOHP programs for prevention and control of the communicable and most prevailing diseases in Libya.
- Define, assess, and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention of priority non communicable and communicable diseases within the different health settings and for specific age groups, and factors influencing the use of health services.
- Define different MOHP policies, systems, programs, approved standards of practice and describe the specific health programs including MCH, family planning, school health, occupational health, etc.
- Describe the role of community physician in addressing local health problems, the prevention and control of vulnerable groups' health problems.
- Define the screening tests pertinent to selected morbidity conditions and the at-risk approach in the application of screening tests.
- Describe the different health education /communication strategies for use with clients, health care team, and the community.
- Describe the quality cycles and its utilization in different public health settings.
- Define basics of demography and vital statistics related to fertility, morbidity and mortality.

Teaching & Learning Methods:

- Lectures: The whole course is given throughout the academic year.
- Clinical rounds: Small group teaching, problem-based learning, seminars, student's presentations, class discussion and tutor (15 hours).
- Field visits with guidance in the selected field sites (4 batches; 15 hours each).
- Epidemiology and statistics exercise 30 hours.

SYLLABUS:**Introduction to Community Medicine:**

- • Concepts and evolution of Public Health, Preventive Medicine, Social Medicine & Community Medicine.
- Significance of community medicine in promotive, curative, preventive and rehabilitative health interventions.

1. History of Medicine:

- • Ancient Medicine and Key Figures
 - Medicine in ancient civilizations: Egypt, Greece, Rome.
 - Contributions of key figures such as Hippocrates, Galen, and Avicenna.
- Medieval and Renaissance Medicine.
 - Medical knowledge during the Middle Ages and the Renaissance period.
 - Advancements and the birth of modern medical practice
- Modern Medicine Development
 - The development of modern medicine in the 19th and 20th centuries.
 - Key discoveries and their impact on healthcare

- Contemporary Medical History
 - The role of technology and public health in shaping modern medicine.

2. General concepts of Health and Disease:

- Definition of health, Dimension and Determinant of health, Health spectrum,
- Concept of disease, Disease causation. Disease spectrum, Natural history of disease, epidemiological triad.
- Disease prevention: Levels of prevention and modes of interventions.

3. Family medicine:

- Principles of family medicine.
- Concepts and Principles of Primary Health Care.
- Bio-psychosocial model: concept, history, difference between biomedical and bio psychosocial model, description of bio-psychosocial model, importance, application and physician center approach, patient centered approach, advantages.
- Common medical problems encountered in family medicine approach (sore throat, back pain, headache, fatigue, anemia, diabetes, and hypertension).
- Red flags of different clinical situations encountered in family practice.
- Communication skills: importance, types, verbal communication skills: vocabulary, paralanguage, hand-on-doorknob syndrome; nonverbal skills: smile, touch, body language, listening skills, empathy. Skills in communicating with elderly, Skills in communicating with anger patient. Breaking bad news: definition, concept, steps (SPIKES).
- Counseling: concepts, stages, scopes, importance, features, benefit of counseling, role of family physician, counseling for behavior modeling, approaches or model, barriers for effective counseling.
- Consultation: definition, objectives, models, advantages, disadvantages, SOAP format.
- Cardiovascular disease risk assessment: WHO/ISH risk prediction charts, types, risk level
- Behavioral modification for obesity, smoking
- Basics of adolescent, disable and geriatric care
- Preventive Health Care and periodic health examination (PHE): definition, purposes, USPSTF recommendations, PHE according to age: screening, counseling, prevention.
- Domestic violence: definition, types, impacts, management and intervention.
- Medical prescription: definition, information includes.

- The referral system: definition, when to refer patient, factors affecting referrals, benefits of referral, the process of referral, referral letter outlines, different types of referrals, and level of referrals.

4. Epidemiology - General considerations:

- Definition, aims, approach and uses of epidemiology.
Sources of epidemiological data. Measurements of disease frequency, health related states and events. Measurements of mortality and certification of death.
- Health indicators: definition, characteristics, types
- Descriptive, analytical and experimental epidemiology. Epidemiological studies: types, purposes, methods, advantages & disadvantages.
- Association and causation: concepts, types, causal relationship, Bradford Hill Criteria for judging causality.
- Dynamics of disease transmission: Modes of disease transmission. Concepts

and strategies for disease prevention, control, elimination and eradication.

- Investigation of epidemic, outbreak control and disease surveillance.
- Disease screening: Concepts and application in community health. Definition and significances of sensitivity, specificity and predictive value.

5. Health information & medical statistics:

- Health information system: component, uses, sources.
- Basic concepts, Uses of statistics, Types of data. Methods of data compilation, and presentation.
- Measures of central tendency and measures of dispersion.
- Inferential statistics
- Sampling
- Probability
- Demography and population dynamics:
 1. Definition, Importance, Demographic cycle, Demographic trends in world and Libya.
 2. Sources of demography.
 3. Characteristics of Libyan population
 4. Population growth pattern & indices
 5. Population pyramid.
 6. Vital statistics, hospital statistics
- SPSS program.

6. Health care management:

- Definition of health care management, domains of administration, popular leadership style, leading and managing, Six management function
- Planning: definition, steps, cycle, and types. Strategic planning, Tactical planning. Organizational culture.
- Goal, objectives, SMART objective, target, SWOT analysis
- Project planning, work breakdown, GANTT chart.
- Crisis management, management by objectives, results-based management, results chain, and business process management.

7. Health care delivery system:

- Definitions and concepts, structure, elements, functions.
- Levels of health care with special reference to primary health care. Definition, principles and components of primary health care. Types of health care services, health financing structure, stewardship concepts and health system reform.
- Health care system in Libya: evolution and history, Existing challenges, shortcomings and weaknesses. Changing priority, health services provision, Governance and management, Libyan health care delivery system, Health care financing, Health workforce, medical supplies and technologies, Health information management, Reform activities.

8. Quality and patient safety:

- Definition, importance, goals of quality improvement, principles, elements.
- Quality improvement, evaluation of health services: process, indicators and outcomes.
- Patient safety: concepts, indicators, examples, assessment, domains and risk management.

9. Research methodology:

- Concepts of research, types, processes
- Data collection methods and tools
- Writing a study protocol
- Writing medical paper (IMRAD)
- Medical and Research ethics: definitions, concepts, importance, principles, general rules, informed consent, and research ethic issues: misconduct (fabrication, falsification and plagiarism), authorship.

10. Occupational Health:

- History, Definitions, Basic concepts and principles
- Occupational hazards classification
- Prevention of occupational diseases and personal protective equipment
- Occupational ergonomic and hygiene.
- Occupational chemical exposure:
 - a- Mode of entry of harmful substance
 - b- Toxicity factors
 - c- Occupational heavy metal exposure:
 - d- Toxic inhalant: metal fume fever, polymer fume fever, organic dust toxic syndrome, common gases (asphyxiant and irritant), VCM gas intoxication
 - e- Occupational lead poisoning: chemistry, uses, mode of exposure, work place exposure, mode of toxicity, clinical finding, lab finding
 - f- Occupational chromium poisoning: chemistry, uses, mode of exposure, work place exposure, mode of toxicity, adverse health effect
 - g- Occupational mercury poisoning: chemistry, uses, mode of exposure, work place exposure, mode of toxicity, adverse health effect
- Occupational physical hazards:
 - a- Noise: hearing threshold, hearing loss: causes, presentation, evaluation, hearing conservation program.
 - b- Vibration: risky group, pathology, presentation, complication, control and prevention
 - c- Heat hazards: heat disorders: causes, presentation, lab finding, complication, indices of thermal stress
- Occupational lung disease:
 - a- Organic Dust diseases: Byssinosis
 - b- Mineral dust disease: Pneumoconiosis: types, causes, exposure sites, pathology, presentation, clinical and radiological finding, preventive measures.

11. Vaccination and Cold Chain:

- Importance of vaccination and how vaccines work.
- Components, types, advantages and disadvantages of vaccines
- Adverse reactions to immunization
- Contraindications & precautions of vaccination
- Causes of vaccination failure
- Factor affecting vaccine potency
- EPI, NPI
- Cold chain: definition, elements, levels, storage equipment, loading of the storage equipment, monitoring equipment.

12. Epidemiology of Infectious Disease:

(epidemiological triad, mode of transmission, prevention and relevant National programs):

- **Air borne infection:**

Chickenpox, Measles, Rubella, Mumps, Influenza, Diphtheria, Whooping cough,

Haemophiles influenzae type B, Meningococcal meningitis, Tuberculosis.

- **Water and food borne infection:**

Poliomyelitis, Viral hepatitis, Acute diarrheal diseases, Cholera, Typhoid, Paratyphoid,

Food poisoning, Amebiasis, Schistosomiasis

- **Arthropod & blood borne infection:**

Malaria, Hepatitis B, C, AIDS.

- **Zoonotic diseases:**

Rabies, Yellow fever, Rickettsial diseases, Plague, Brucellosis, Leishmaniasis, Hydatid disease.

- **Surface infection:**

Tetanus

- **Emerging & re-emerging infectious disease:**

definition, contributed factors, examples of diseases, strategy to reduce threats.

- **Travel medicine:** importance, travel clinic, pre-travel guidance, approach, risks to traveler, concerns, travel advices, precautions, post travel evaluation.

13. Environmental Health:

- Basic concepts, component of environment. Health hazards arising out of environmental conditions.
- Environmental risk assessment
- Causes, effect and control and preventive measures of:
 - a- Air pollution
 - b- Water pollution
 - c- Soil pollution
 - d- Marine pollution
 - e- Thermal pollution
 - f- Nuclear hazards
 - g- Solid waste management.
 - h- Role of individual in prevention of pollution
- Pollution case study
- Disaster management: floods, earthquakes, cyclones, landslides.

14. Infection Prevention and Control:

- Standard precaution: definition, types, hand hygiene, safety injection, use of PPE.
- Instrument reprocessing: risk to patients from equipment, decontamination levels, methods of instrument reprocessing.
- Aseptic techniques: definition, general guidelines.
- Environmental cleaning: definition, protective clothing for cleaning, hospital environment risks.
- Disinfectant use: indication, types.
- Waste management: definition, types of wastes, management.
- Cough etiquette and respiratory hygiene
- Transmission based precautions: contact precaution, droplet precaution, air borne precaution.

15. Nutrition and Health:

- Balanced diet: (middle eastern, vegetarians, Islamic and Hindu, Libyan)
- Nutrients: carbohydrates, fat, protein, vitamins, minerals Probiotics
- Nutrient recommendations
- Nutrition guidelines: MyPyramid and My Plate.
- Malnutritional problems:
 - a- Protein energy malnutrition: definition, magnitudes, causes, types, underweight, stunting, wasted, marasmus, kwashiorkor, failure to thrive. Screening for under nutrition, prevention of PEM
 - b- Iodine deficiency disorders: IDD problem pyramids, prevention
 - c- Vitamin A deficiency: causes, stages of xerophthalmia, food sources of vitamin A, prevention
 - d- Vitamin D deficiency: causes, presentation, sources of vitamin D, immunologic effect of vitamin D, vitamin D in human disease states, cardiovascular effect of vitamin D, interrelationship of vitamin D and cancer
 - e- Osteoporosis: definition, causes, sites, diagnosis, prevention
 - f- Zinc: importance, deficiency, clinical features, sources

- **Nutritional assessment:**

definitions, determinants of growth and development, nutrition assessment objectives, methods: direct and indirect; weight, height, head and chest circumferences, weight for age, weight for height, mid upper arm circumference, reference and standard values, WHO growth charts. Assessment methods of nutritional status of adult: Brocca index, BMI, waist circumferences, waist hip ratio. Biochemical and laboratory evaluation, dietary intake assessment, vital health statistics, assessment of ecological factors.

- **Nutrition related chronic diseases:**

- a- Over weight / Obesity: dietary treatment of obesity. Exercise, pharmaceutical treatment, surgical treatment
- b- Diabetes mellitus: nutrition related risk factors, nutrition related prevention, diabetic plate, glycemic index chart, and diabetic food exchanges (daily), alternative sweeteners, Paleo diet.
- c- coronary heart disease: nutrition related risk factors, nutrition related prevention,
- d- Hypertension / stroke: nutrition related risk factors, nutrition related prevention, DASH diet
- e- Cancer: nutrition related risk factors, nutrition related prevention.

16. Psychology Medicine and behavioral sciences:

- Theories and Definitions
- Foundation of human behavior
- Human Development
- Theories of human development
- Nature and Nurture Interplay
- Sensation, perception, and attention
- States of consciousness
- Learning
- Thinking, problem solving, and language.
- Memory
- Motivation
- Intelligence

- Emotion, and Health and stress
- Personality
- Abnormal behavior
- Social psychology

17. Mental Health;

- Definitions.
- Characteristics of mentally healthy person.
- Mental disorders: magnitude, importance, impact, causes and determinants.
- Types of mental illnesses.
- Generalized anxiety disorders: definition, risk factors, prevalence, onset, course, associated problem, treatment.
- Phobic disorders: definition, types.
Obsessive compulsive disorder: definition, etiology, prevalence, onset, course, treatment.
- Post-traumatic stress disorders: definition, etiology, prevalence, onset, presenting symptom, treatment, prevention.
- Mood disorders: definition, causes, types.
- Depression: definition, causes, presenting symptom.
- Substance related disorders: burden, process, types, criteria, severity ratings for substance use disorders, diagnosis, warning signs, indicators, risk factors, most popular drugs used, long term effects, Prevention elements and approaches.
- Stigma: definition, effects, how can challenge stigma?
- Prevention programs of mental disorders

18. Epidemiology of Non-Communicable Diseases (NCDS):

- Epidemiological transition
- NCDs: Definition, characteristics, types (Hypertension, diabetes, cancer, overweight and obesity, stroke, blindness), burden, risk factors, general outlines for prevention and control
- Role of PHC physician in prevention and control of NCDs.

19. Accidents and Injuries:

- Definition, magnitude, risk factors
- Epidemiological triad of RTI, measurements of the problem (mortality, morbidity, disability), trends worldwide and in Libya, prevention

20. School Health:

- Definition, importance, objectives of School Health.
- Aspects of School Health Services: health appraisal of school children, preventive services, remedial measures and follow up, healthful school environment, nutritional services, first aid and emergency care, mental health, dental health, eye health, health education, school health records
- Physical school environment recommendations: location, site, structure, class room, furniture, doors and windows, ventilation, lighting, glare, color, water supply, eating facility, acoustic comfort, rest room, safety and security.
- Positive emotional environment

21. Global (International) Health:

- Definition, concerns, why, key principles
- Difference between global health and public health.
- Examples of global health issues

- Sustainable development goals
- Global health concepts.
- The global burden of diseases and risk factors
- The organization and function of health system.

22. Ethics of Medicine:

- Introduction to Medical Ethics
Basic principles: autonomy, beneficence, non-maleficence, and justice
Ethical decision-making in medical practice
- Patient Confidentiality and Privacy
Importance of maintaining patient confidentiality in clinical settings.
Legal and ethical frameworks surrounding patient privacy.
- Informed Consent
The concept of patient autonomy in decision-making and consent.
Ethical and legal implications of informed consent.
- End-of-Life Issues
Ethical considerations in terminal care, euthanasia, and palliative care.

Clinical Topics:

1. Approach to patient with common complain (Sore throat, headache, low back pain, fatigue)
2. Approach to patient with chronic disease (diabetes & hypertension, hepatitis B)
3. Analyze the epidemiological data of patients with infectious diseases (hepatitis, AIDS). Dealing with Hepatitis B Chronic Carrier (Family protection).
4. Recognize the methods of safe injections and safe blood transfusion.
5. Diagnose TB and attend the DOTS clinic, leishmaniasis clinic.
6. Conducting appropriate appraisal of the school students' current health status and assess the school environment.
7. CV risk assessment.
8. Diabetic foot care.

Topics for practice and discussion:

1. Communication skills in history taking for common problems.
2. Communication skills in special occasions (breaking bad news, elderly patient, counseling).
3. Nutritional assessment.
4. Vaccination & cold chain.
5. Writing prescription & referral.
6. Hand hygiene.
7. Protective measures for air borne diseases.

REFERENCES:

- Rakel RE. Essentials of Family Practice Medicine, Fundamentals and Case Studies. 8th edition, 2011 Saunders
- Benjamin Lahey. Psychology: An Introduction 11th (eleventh) edition
- Essentials of Public Health: L. J. Donaldson, R. J. Donaldson.
- Public Health & Preventive Medicine: Maxcy - Rosenau- Last.
- Communicable Disease Epidemiology and Control: Roger Webber, London

FORENSIC MEDICINE & CLINICAL TOXICOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Forensic and Toxicology	60	30	31	125	246

Course Objectives:

The course aims to provide the students with the:

- Basic background of different medico legal aspects of living and dead individuals and remains or parts of dead bodies.
- Basic knowledge of medical ethics and malpractice.
- Ability to diagnose and manage intoxicated patients.

Professional & Practical Objectives:

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

- Identify living and dead individuals.
- Diagnose death by different clinical and investigatory methods.
- Determine time of death through assessment of post mortem changes and interval.
- Identify different causes of death and manner of death as well.
- Examine different wounds and injuries and write a proper primary wound report.
- Make preliminary tests for blood grouping and toxicological screen.

Learning Outcomes:

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

- Describe different medico-legal aspects of living and dead individuals regarding personal identification, diagnosis of death, causes and manner of death, postmortem changes and differentiation between types of wounds and patterns in different areas and their complications.
- Explain medico-legal (ML) aspects of different cases of sexual offences.
- Explain maternal morbidity and mortality from ML point of view.
- Explain various ML aspects of malpractice.
- Describe basic background of medical ethics.
- Explain different types of physical injuries.
- List different classes of common toxic substances and environmental pollutants.
- Explain the circumstances of intoxication, toxic doses, toxicokinetics clinical picture, differential diagnosis of different drugs and toxic substances in relation to most common poisons.
- Explain initial appropriate first aid treatment and antidotal measures for different drugs and toxic substances.

SYLLABUS:**I. Topics covered in Forensic Medicine:**

- Terminology and different medico-legal systems.
- Thanatology:
 - Death certification, body disposal, brain death, organ transplantation, postmortem changes, time of death.
- Manner of death, diagnosis of death, death associated with surgical.

- procedures, sudden death, sudden infant death syndrome.
- Identification (living and dead):
- DNA profiling, blood stains, primary & secondary physical characters.
- Skeletal remains; determination of sex, race, stature, age, dating skeletal remains.
- Wounds and its interpretation:
- General wounds, regional injuries and its complications.
- Medicolegal reports and documentation.
- Fire arm and explosive injuries.
- Physical injuries, transportation injuries.
- Sexual offences and its legal aspects.
- Medico-legal aspects of infanticide.
- Violent asphyxia.
- Bodies recovered from water.
- Child abuse.
- Medicolegal aspects of pregnancy, abortion, delivery.
- Medicolegal aspects of mental diseases.
- Insanity, criminal responsibility, mental health legislation, testamentary capacity.
- Neglect, starvation, hypothermia.
- Abuse of human rights:
- Torture & deaths in custody.
- Medical ethics & Malpractice.
- legal procedure in criminal courts.
- Personal identity.
- Post mortem examination a change after death.
- Exhumation.
- Death in its Medico legal aspects.
- Examination of Biological stains and hair.
- Death from asphyxia.
- Death from starvation Cold and heat.
- Injuries from Burns, scalds, lightning, electricity.
- Medico legal aspects of wounds.
- Forensic ballistics and Explosion injuries.
- Traffic accidents, Vehicular injuries, Aircraft injuries.
- Regional injuries.
- Legitimacy.
- Insanity and medico legal aspects.
- Law in relation to medical men.

II. Topics covered in Clinical Toxicology:

- General toxicology:
- Definitions, classification of poisons, specific organ toxicity.
- Toxicokinetic, clinical examination, investigation, & treatment of a poisoned patient.
- Corrosive and bleaching substances.
- Pesticide poisoning:
- Insecticide, Herbicide, & Rodenticide.
- Therapeutic Toxicity:

- Salicylate, paracetamol, barbiturates, digitalis, iron, antihistamines, neuroleptics.
- lithium.
- Toxicity of Alkaloids:
- Opiates, cannabis, cocaine, strychnine, atropine, & ergot.
- Inhalants Poisoning:
- Carbon monoxide, carbon dioxide, cyanide, chlorine & ammonia.
- Volatile Poisoning:
- Ethyl and methyl alcohols, & kerosene.
- Drug and Substances of Abuse.
- Drug dependence.
- Heavy Metal Poisoning:
- Food Poisoning.
- Animal Poisoning:
- Scorpion, snake & spider.
- Poisons and their medico legal aspects.
- Irritant poisons, Inorganic (non-metallic, metallic) and Organic.
- Neurotic Poisons, somniferous, inebriants, delirians, stimulants.
- Spinal poisons.
- Cardiac poisons.
- Asphyxiants.
- Peripheral Nerve poisons.
- Chemical warfare agents.

PRACTICALS AND LABORATORY INVESTIGATIONS COVERED:

- The students will be divided into four rounds (A, B, C, D). o Each round will be divided into 2 subgroups (1, 2) each subgroup will attend clinical round.
- Visits of students to mortuaries.
- Examination of firearms.
- Examination of collection of bones.
- Demonstration of radiological specimens.
- Demonstration of museum specimens and photographs.
- Examination of blood: its detection, differentiation of human blood and animal blood.
- Hairs, difference between human and animal hair, cotton and synthetic fibers.
- Examination of lethal weapons and injuries caused by them.
- Examination of poisonous plants, roots, and seeds etc.
- Identification of poisonous snakes, scorpions, and other insects.
- Analytical toxicology: Qualitative and Quantitative identification. Lectures, practical and demonstration classes are taken in four batches (block teaching), comprising of ninety hours of studies in total for each block.
- Demonstration of specimen in toxicology.

REFERENCES:

- Forensic Medicine Encyclopedia.
- Forensic Pathology of De Mayo.
- Principles of Clinical Toxicology.
- Emergency Toxicology.
- Forensic Pathology of B. knight.

- Pitfalls of Toxicology of Olson.

OPHTHALMOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Ophthalmology	35	20	46	188	289

Course Objectives:

- To enable students to be familiar with normal structure of the eye.
- To enable students to give basic health care and preventive measures to limit endemic diseases.
- To enable students to recognize common causes of visual loss and their management.
- To enable students to recognize emergency cases and guidelines for referral to the specialist.

Professional & Clinical Objectives:

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

- Interpret the most important symptoms and signs of diseases in ophthalmic patients.
- Define basic investigations related to important ocular diseases.
- Communicate properly with patients to have relevant data related to their problems.
- React kindly and respectfully to the patients during history taking and clinical examination.

Learning Outcomes:

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

- Describe appropriate management for common diseases affecting the eye.
- Outline the management of emergencies and priority of management.
- Describe the causes and pathogenesis of the most important ophthalmic diseases.
- Describe the clinical symptoms and signs of common ocular diseases.
- Describe the clinical symptoms and signs of ocular manifestations associated with systemic diseases.
- Describe the causes and pathogenesis of the most common ophthalmic problems.
- Determine the appropriate diagnostic tools to aid in the diagnosis of common ophthalmic problems.
- Determine therapeutic lines for important and basic ophthalmic health care.

Teaching & Learning Methods:

- Lectures: The whole course is given throughout the academic year.
- Clinical rounds (small-group teaching, practice of clinical skills, video demonstration of basic operative procedures). Each term, students are divided into 6 groups attending outpatient clinics and inpatient rounds, and students are allowed to attend operative procedures (elective).
- Ophthalmic inpatient wards.
- Outpatient clinics.
- Attending the emergency shifts periodically.

Student assessment methods:

- Written examination to assess knowledge and understanding.
- Oral examination to assess knowledge and understanding.
- Clinical examination to assess practical skills.

SYLLABUS:**I. Anatomy and Physiology of the Eye:**

- Embryology and anatomy.
- Physiology of the eye.
- Physiology of vision.
- Neurology of vision.

II. Ophthalmic Optics:

- Elementary optics.
- Elementary Physiological optics.
- Determination of the Refraction.
- Errors of Refraction.
- Anomalies of Accommodation.

III. Examination of the Eye:

- External Examination.
- Examination of the Fundus.
- Fundus Oculi.
- Examination of Retinal Function.
- General Therapeutics.

Examination by Inspection, position of the eyes, Ocular movement, anterior segment, pupil, and visual field Examination.

IV. Diseases of the Eye:

- **Diseases of the Conjunctiva:** Bacterial, fungal, Viral, allergic, Chemical, Trachoma, viral catarrh, phlyctenular conjunctivitis, folliculosis, chlamydial ophthalmia Neonatorum, Conjunctival xerosis, degeneration, pinguecula, pterygium.
- **Diseases of the cornea:** corneal oedema, ocular ulcer of bacterial, viral, fungal. perforation, and its complications, hypopyon ulcer, dendritic ulcer, disciform keratitis. Exposure keratitis, Neurotropic ulcer, sclerosing keratitis, interstitial keratitis. Corneal opacity: corneal vascularization. Band shaped keratopathy. Arcus senilis, corneal degenerations and dystrophies. Keratoconus.
- **Diseases of the Sclera:** anatomy and physiology. Blue sclera, Ectasia, staphylomas, Scleritis, Episcleritis, scleromalacia, sclera injuries, ruptures.
- **Diseases of the Uveal Tract:** anatomy and physiology, Uveitis- acute and chronic complication of Uveitis specific types- associated with joint disease, Heterochromic, lens induced uveitis, tuberculous, Lepromatous, Bechet's disease, toxoplasma, Toxocariasis, Histoplasmosis, Red eye D.D, Systemic ophthalmia, Pantophthalmids. Uveal tumors-malignant melanoma.

- **Diseases of the Lens:** (structure and function, Congenital anomalies, lens dislocation- cataract: congenital cataract, senile cataract, toxic cataract, complicated cataract, cataract associated with systemic disease, After cataract. Cataract surgery: aphakia and its correction).
- **Diseases of the Glaucoma:** formation and circulation of aqueous humor, intra- ocular pressure. Detailed anatomy of the angle of anterior chamber. Definitions: Glaucoma, ocular hypertension, Hypotony. Role of genetics in glaucoma. Types and classification: primary open angle glaucoma / Angle closure glaucoma. Secondary glaucoma/ congenital primary associated with various developmental anomalies/ Absolute glaucoma/ clinical picture of each type, mechanism, Pathogenesis: Differential Diagnosis :/provocative tests for glaucoma (open and closure). Medical and surgical Treatment.
- **Diseases of Retina:**
 - Anatomy and physiology.
 - Congenital anomalies.
 - Commotion retinae.
 - Retinal artery occlusion.
 - Retinal vein occlusion.
 - Retinitis pigmentosa.
 - Cystoid degeneration.
 - Retinitis pigmentosa.
 - Cystoid degeneration.
 - Retinoschisis, senile macular degeneration.
 - Retinal detachment-primary, secondary, principles of management.
 - Retinoblastoma.

V. Neuro-ophthalmology:

- Optic pathway- applied anatomy and physiology.
- Lesion and tumors affecting optic chiasm.
- Disorders and Syndromes affecting 1.4.6. Cranial Nerves.
- Nystagmus – physiological and pathological.
- Ocular manifestations of cerebral and cerebellar tumors.
- Ocular manifestation of head injuries.
- Ophthalmoplegic migraine, Neuro fibromatosis.
- Myasthenia gravis.
- Daune's Syndrome, Marcus –Gunn Jaw winking phenomenon.

VI. Intra-ocular Tumors.

VII. Ocular trauma:

- Trauma of eye ball, Trauma to ocular adnexa.
- Clinical examination of the eye with trauma.
- Types- perforating and non-perforating.
- Offending source, chemical solutions, foreign bodies, blunt objects, sharp objects (knives, scissors).
- Intraocular foreign body (metal, glass, other).
- Investigation and localization of the F.B.
- Clinical pictures and management of perforating and non-perforating injuries.

- Effects of intraocular retained F.B (siderosis, chalcosis).
- Sympathetic ophthalmia, endophthalmitis, pan ophthalmitis.
- Enucleation and evisceration in event of gross irreversible damage.
- Trauma to adenexia, lids, orbit

VIII. Vitreous:

- a. Anatomy and physiology
- b. Examination of Vitreous
- c. Vitreous floaters
- d. Hemorrhage
- e. Detachment
- f. Vitreous retraction
- g. Vitreous degeneration-syneresis
- h. Asteroids, synchiasis
- i. Vitreous surgery

IX. Ocular pharmacology and toxicology:

- a. Routes of administration.
- b. Anesthetics, antibiotics, astringents, miotics, mydriatics, cycloplegic.
- c. Diagnostic dyes-fluorescein, rose Bengal.
- d. Anti-viral and anti-fungal drugs.
- e. Drugs used in the treatment of glaucoma.
- f. Antichlamydial agents.
- g. Tears substitutes.
- h. Toxicity of antibiotics, atropine, steroids, acetazolamide.
- i. Ocular manifestations of systemic use of: chloroquine, ethylbutol, antibiotics, quinine, and corticosteroids.

X. Optics and refraction of eye: Optics of spherical surface, refractive power and mechanism of normal eye, emmetropia, ametropia, hypermetropia, myopia, astigmatism, presbyopia, aphakia, anisometropia, contact lens and intraocular lens implants.

XI. Diseases of eye lids:

- a. Applied anatomy and physiology.
- b. Development deformities: Epicanthus, congenital ptosis.
- c. Infection and inflammations of lids: sty, chalazion, blepharitis.
- d. Allergic dermatoses.
- e. Ptosis, pseudoptosis.
- f. Tumors of the lids.

XII. Lacrimal apparatus:

- a. Applied anatomy and physiology.
- b. Dacryoadenitis, canaliculitis, dacryocystitis.
- c. Epiphora and lacrimation.
- d. Staphylomas.
- e. Scleritis, episcleritis, scleromalacia.
- f. Scleral injuries, ruptures, tears, source, function, and composition.
- g. Pre-ocular tear film.
- h. Dry eye syndrome.
- i. Hypersecretion.

XIII. Pupil:

- Pupillary pathways and papillary reflexes.
- Dilated pupil, constricted pupil.
- Pupil in various diseases.
- Pupil in head injuries.
- Tonic pupil, Horner's syndrome, Argyl-Robertson pupil.
- Action of drugs on pupil.

XIV. Optic Nerve:

- a. Applied anatomy and physiology.
- b. Optic neuritis, retrobulbar neuritis.
- c. Papilledema.
- d. Optic atrophy.
- e. Demyelinating diseases.
- f. Toxic-alcohol and tobacco amblyopia.

XV. Diseases of the Orbit:

- a. Applied anatomy and physiology of its contents.
- b. Exophthalmos (proptosis), Enophthalmos.
- c. Inflammatory orbital diseases, orbital cellulites, pseudo tumors, cavernous sinus thrombosis.
- d. Orbital tumors (primary, secondary and metastatic).
- e. Orbital injuries, foreign body, contracted socket.

XVI. Systemic ophthalmology:

- a. Hypertensive retinopathy.
- b. Ocular manifestation of retina, leukemia.
- c. Diabetic retinopathy.
- d. Thyroid gland disorders, grave's disease.
- e. Avitaminosis, deficiency of vitamin A, B1, B2, C.
- f. Granulomatous diseases: tuberculosis, syphilis, toxoplasmosis, sarcoidosis.
- g. Viral diseases: Herpes simplex, herpes zoster, rubella syndrome.
- h. Collagen diseases: ocular manifestation of:
- i. Rheumatoid arthritis, Reiter disease.
- j. Giant cell arteritis.
- k. Behcet's disease, Albinism.
- l. Vogt-Koyanagi-Harada syndrome.
- m. Myasthenia gravis, myotonia, dystrophica.

XVII. Ocular motility and squint:

- a. Anatomy and physiology of extraocular muscles and nerves.
- b. Yoke muscles- conjugated movement, control of movement.
- c. Ocular movement. Ductions.
- d. Binocular version – simultaneous perception, fusion, stereopsis.
- e. Heterophorias, heterotropia.
- f. Paralytic, non-paralytic (concomitant).
- g. Etiology, clinical picture of III, VI, VI nerve palsies.

- h. Objectives and principles of management of heterophoria and heterotropia, muscles surgery.
- i. Amblyopia (prevention and treatment).

XVIII. Pediatric ophthalmology:

- a. The normal eye in infant and children.
- b. Congenital eye defects, retrolental fibroplasias.
- c. Developmental body defects association with ocular defects.
- d. Post-natal ocular problems.
- e. Test of visual acuity.

XIX. Preventive ophthalmology:

- a. Elimination of hazards to the eye caused by accidents, improper use of drugs.
- b. Use of properly fitted safety goggles.
- c. Early recognition of diseases, glaucoma, trauma, refractive errors, infections,
- d. Prevention of neglect/un-detection of eye diseases in patient being treated for other illness.
- e. Prevention of radiation injuries, exposures, keratitis, vit. Deficiency.

CLINICAL TRAINING IN OPHTHALMOLOGY

The clinical training is Imparted to the undergraduate students during the five weeks after the theory lectures the program as under in the university teaching Tripoli eye hospital bed side clinics are conducted under the supervision of clinical tutor for the whole period The group of 8-9 students are made to learn how to approach an eye patient clerking the clinical details of various types of common and uncommon diseases and then subjected to group discussion in the presence of guidance of the teacher.

Outpatient coaching is given to the student in groups of 4 -5 who look the consultant and senior

residents conducting the general OPD the students are demonstrated the anterior segment diseases refractive errors and fundus lesions.

REFERENCES:

- Kanski Clinical Ophthalmology.
- American Academy series.
- Oxford Hand Book of Ophthalmology.
- Willis Eye Manual.

OBSTETRICS & GYNAECOLOGY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Gynecology and Obstetric	95	60	93	375	623

BROAD LINES:

- The department of obstetrics and gynecology of University of Tripoli has 4 units attached to it, one in Al-Jala maternity and children's hospital with 350 obstetrics beds and 120 gynecology beds, the second at Al-khadra hospital with 70 obstetrics & gynecology beds.
- The third in Salahuddin hospital with 120 beds and deal with gynecological oncology, and the fourth in Tripoli medical center with 70 obstetrics & gynecology beds, the main units are at al-Jala hospital and have a total delivery of 24,000 per annum and 12,000.
- Gynecological admissions with total of 4,500 operative interference, its recognized unit by royal college of obstetrician & gynecologist in London for post graduate training and by the pan Arab board for fellowship.

THE TEACHING PROGRAMME FOR UNDERGRADUATES:

- Fourth year students are posted in the department in two batches 60-80 students each. The students are divided into 5-6 subgroups for the clinical teaching.
- The course in duration is ten weeks and given twice a year with two weeks revision following that.
- Sessions are usually instructional.
- Clinical total 60 sessions, each session of two hours include 30 minutes for history taking, the presentation and discussion.
- Total obstetrics and gynecology lectures 95 covering the main topics in the subject.
- Tutorial total of 468 hours covering the practical problems facing the obstetrics & gynecology included the history of the main topics.
- The students are handed a log-book to carry out 20 normal deliveries, 5 dilatation and curettage. And to attend 5 forceps, 5 vacuum deliveries and 5 caesarean sections and present at minimum of 10 clinical cases.

Course Objectives:**Obstetrics:**

- Prepare an oriented physician who can face the responsibility of managing normal pregnancy, labor, and puerperium, as well as care of the normal newborn.
- Prepare a capable physician responsible for the correct, early diagnosis of possible emergencies and complications that may be encountered in Obstetrics; so, sharing in reduction of maternal mortality.

Gynecology:

- Knowledge of different patterns of normal and abnormal menstruation with reference to endogenous hormonal status from puberty to menopause.
- Placement of emphasis on prevention and early detection, including the role of screening for pelvic infections and STDs.
- Placement of emphasis on prevention and early detection, including the role of

screening (e.g., for detection of malignancy).

- Knowledge of different methods of contraception and proper counseling.

Professional and Practical Objectives:

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

- Observe the conduct of second and third stages of labor.
- Attend management and observe signs of obstructed labor.
- Recognize the causes, diagnosis, and management of post-term pregnancy and hazards of post-maturity, prematurity, intrauterine fetal death.
- Recognize the types, etiology, clinical picture, prevention, and management of brain hemorrhage, brachial plexus injury, and skeletal and muscle injuries.
- Recognize how to evaluate the newborn condition and to diagnose neonatal respiratory distress. Learn how to competently resuscitate a newborn infant in respiratory distress.
- Understand the magnitude of endometriosis, emphasizing preventable and avoidable risk factors and causes.
- Understand the normal human sexual response and common sexual problems.

I. Obstetrics:

1. Conception and pre-conceptional care and counseling:

- Know the basic physiological background of fertilization, implantation, and early development of the fetus, placenta, and cord.
- Identify infectious and genetic problems that may be detected.
- Counsel about fate of these preconception problems.

2. Antenatal period:

- Know the different placental functions and abnormalities. Know the theories of formation and functions of liquor amnii. Know the basis of fetal circulation and Enumerate Physiological changes with pregnancy.
- Mention procedures and enumerate biochemical testing of early pregnancy diagnosis and know how to diagnose pregnancy in each trimester.
- Take history. Perform general and abdominal examination of normal pregnant cases including demonstration of understanding of instructions for women about normal pregnancy, counseling for minimal complications and Immunizations, including tetanus.
- Mention diagnosis, differential diagnosis, complications and enumerate lines of management of hyperemesis gravidarum and pyelitis during pregnancy.
- Demonstrate identification and palpation of renal angle for tenderness.
- Define & enumerate risk factors, pathogenesis, diagnosis, fate, complications and lines of management of abortion, ectopic pregnancy, vesicular mole, antepartum hemorrhage and shock.
- Understand the magnitude of high-risk pregnancy; its different etiologies, and identification systems, and emphasize preventable and avoidable causes especially cases of Diabetes mellitus (DM), anemia. Heart disease during pregnancy and hypertension with demonstration of detection of edema and measuring blood pressure and Diagnosis of emergencies such as eclampsia.
- Mention etiology, pathology, diagnosis, and management of amniotic fluid disorders (oligo-poly-amnionitis), fetal growth disorders and Rh isoimmunization.
- Recognize and utilize basic diagnostic tools such as electronic fetal monitoring, non-stress test, contraction stress test and biophysical profile.
- Know definition, enumerate indications and safety of ultrasound in obstetrics and findings in different conditions.

3. Intranatal care:

- Enumerate the different anatomical measures of female pelvis and fetal skull and uterine action.
- Define, enumerate physiology, mechanism, and management of normal labor.
- Perform uterine massage and make sense of uterine tone feeling Perform routine neonatal examination.
- Understand the different methods of local, regional, and general anesthesia and their complications.
- Fill the items of the partograph and interpret it.
- Define, mention all causes, diagnosis, and management of occipitoposterior position, face, brow, breech, shoulder, cord presentation and prolapse, complex presentation and multiple pregnancies.
- Define and describe the causes, complications and diagnosis and treatment of the common types of contracted pelvis, soft tissue obstruction, abnormal uterine action, obstructed labor, ruptured uterus and genital tract during labor.

4. Postpartum care:

- Enumerate all the causes, diagnosis and competently rank in order the lines of management of complications of third stage of labor, especially stressing on postpartum hemorrhage.
- Diagnose second degree perineal lacerations.
- Counsel postpartum women for breastfeeding, self-care and future contraception.
- Attend and observe episiotomy and Ventouse delivery.
- Recognize physiological changes during puerperium with stress on causes, pathology, diagnosis, differential diagnosis, and management of puerperal pyrexia especially puerperal sepsis.
- Mention indications, techniques, and complications of induction of labor.
- Mention types, indications, technique, and complications of the obstetric forceps and ventouse in modern obstetrics.
- Know the indications, types, techniques, and complications of cesarean section.
- Recognize the indices, causes, and prevention of maternal and perinatal mortality.

II. Gynecology:

By the end of this course the student should be able to perform the following basics:

Enumerate names, structure of and illustrate with diagram the anatomical features of the female genital tract and its development with reference to its clinical applications.

1. Gynecological endocrinology and infertility:

- Enumerate theories, describe physiology, anomalies, and management of puberty, and climacteric.
- Demonstrate understanding of the physiology of and factors controlling.
- Understand the types, causes, proper investigation, and management of abnormal bleeding.
- Understand the types, causes, and treatment of dysmenorrhea and know the causes and management of premenstrual syndrome (PMS).

2. Recognize the causes, diagnosis, and treatment of amenorrhea:

Mention the magnitude of the infertility problem and its different etiologies, emphasizing preventable and avoidable causes and anovulation. He should recognize and utilize basic diagnostic tools, and treatment of infertility.

3. Gynecological Infections:

- Recognize causes, types, and methods of diagnosis and management of STIs.
- Understand the normal vaginal flora, defensive mechanisms of the female genital tract, causative organisms, clinical picture, diagnosis, and treatment of both lower and upper (PID) genital tract infection and differential diagnosis, and management of vaginal discharge.
- Understand the epidemiology, causes, diagnosis, complications, and management of genital bilharziasis and tuberculosis.

4. Gynecological displacements, endometriosis and Sexual dysfunctions:

- Demonstrate understanding of the magnitude of, causes (preventable and avoidable) and management of pruritus vulvae, genital prolapse, RVF, SI complete perineal tear and rectovaginal fistulas problems.

5. Gynecological Oncology:

- Demonstrate understanding of the magnitude of, causes (preventable and avoidable) and management of uterine fibroid.
- Enumerate and describe DD of vulvar swellings, dystrophies and vulvar intraepithelial neoplasia (VIN) and understand the pathology, diagnosis, and treatment of vulvar cancer.
- Recognize the methods of diagnosis of CIN and invasive disease, observe cervical smear procedure, and mention lines of treatment and protocols of treatment of CIN and invasive cervical cancer.
- Understand the risk factors, pathology, diagnosis, staging and treatment of endometrial hyperplasia, endometrial carcinoma, and uterine sarcomas including its early detection.
- Recognize the classification and the pathology of benign and malignant ovarian tumors, the investigations required for the diagnosis of ovarian cancer including its early detection and different protocols used for treatment of the various types of ovarian neoplasms.
- Recognize the classification and the pathology of GTD, prognostic factors and the diagnostic work-up of choriocarcinoma and protocols of both the treatment and follow-up.

6. Family planning:

- Enumerate the different contraceptive methods: their uses, types, advantages, disadvantages, and complications, EBM opinions in Hormonal methods observe loop insertion and counsel cases about family planning selection and fertility regulation.

SYLLABUS:**I. Topics in Obstetric:**

- obstetrics history taking.
- obstetrics examination.
- Introduction to Gynecology and Obstetrics.
- Anatomy of the Genital Tract & Fetal Skull.
- Physiology of Menstruation.
- Fertilization and implantation.
- Placenta and Amniotic Fluid.

- Anatomical and Physiological Changes in Pregnancy.
- Diagnosis of Pregnancy.
- Antenatal and prenatal Care.
- Malformation of female genital tract.
- Mechanism of labor.
- Management of normal labor and partogram.
- Abortion.
- Ectopic pregnancy.
- Gestational trophoblastic disease.
- Ante-partum hemorrhage.
- Poly and oligo-hydramnios.
- Hypertensive Disorders in Pregnancy.
- Cardiac and pulmonary diseases in Pregnancy.
- Anemia and blood transfusion.
- Diabetes mellitus.
- Urinary tract infection and renal diseases.
- RH isoimmunization.
- Infection in pregnancy.
- Multiple pregnancy.
- Abnormal Presentations and Positions.
- Acute abdomen during pregnancy.
- Miscellaneous medical disorders.
- Labor and its complications.
- Prolonged pregnancy.
- Fetal surveillance and fetal distress.
- Normal and Abnormal Puerperium.
- IUGR and IUFD.
- Preterm labor and PROM.
- Dystocia.
- PPH.
- Complications of third stage.
- Shock in obstetrics.
- Drugs, Analgesia and anesthetic in obstetrics.
- Obstetric procedures; episiotomy, vacuum, forceps.
- CS and its complications.
- Thromboembolic disorders.
- USS (in obstetrics and gynecology).
- Perinatal and maternal morbidity and mortality.
- Grand multipara and elderly PG.
- Care of newborn.

II. Topics in Gynecology:

- History taking.
- examination of gynae case.
- Normal and abnormal vaginal Discharge.
- Normal and abnormal puberty.
- Menstrual Disorders.
- pelvic pain & Dyspareunia.

- Vaginal discharge and Reproductive Tract Infections.
- Endometriosis and adenomyosis.
- Genito-Urinary Fistula, Stress Incontinence, urodynamics.
- Genital Prolapse.
- Contraception and Family planning.
- Infertility.
- Hirsutism, virilism, PCO.
- Menopause and HRT.
- PMB.
- Uterine Fibroids.
- Gynecologic Oncology (cancer cervix, cancer uterus, cancer ovary...etc.).
- Diseases of vulva and vagina.
- Imaging in Gynecology, Endoscopy.
- Hysterectomy.
- Operative Gynecology.
- laparoscopy.
- sexual transmitted diseases.
- cytology and colposcopy.
- pelvic inflammatory diseases.
- Intersex.
- congenital abnormalities of genital tract.
- Laparoscopy.
- Endometriosis.
- Family Planning.
- Chemotherapy and radiation.
- Cancer cervix.
- Cancer uterus.
- Cancer Ovary.
- Cytology and Colposcopy.
- Intersex.
- Fistula.
- Pelvic inflammatory diseases.
- Utero-Vaginal Prolapse.
- Benign Lesions of the cervix.
- Benign condition of the Uterus.

CASE DISCUSSION IN OBSTETRICS AND GYNAECOLOGY:

- Management of labor.
- Pain relief in labor.
- Repair of episiotomy and third-degree tear.
- Operative vaginal delivery.
- Normal puerperium.
- Dilatation and curettage.
- Lactation.
- Polyhydramnios and oligohydramnios.
- Occipito posterior position.
- Post operative managements.
- Glycosuria and proteinuria in pregnancy.

- Diet in pregnancy.
- Shock in pregnancy.
- Prolonged labor.
- Ante-partum hemorrhage.
- Post-partum hemorrhage.
- Ultrasound in obstetrics and gynecology.
- Face, brow, and shoulder presentation.
- Assessment of fetal maturity.
- Examination and resuscitation of newborn.
- Dysfunctional uterine bleeding.
- Breech presentation.
- Infant bleeding.
- Placenta Function.
- Cardiac diseases in Pregnancy.
- Maternal and perinatal mortality.
- Placenta previa.
- Abruptio placenta.
- Forceps and Ventouse delivery.
- Acute abdomen in pregnancy.
- Abnormal puerperium.
- Post maturity.
- Urinary Tract infection in pregnancy.
- Rupture Uterus.
- Neonatal Jaundice.
- Anemia in Pregnancy.
- Vomiting in Pregnancy.
- Fetal antenatal monitoring.
- Introduction of labor.
- P.E.T. Eclampsia.
- Renal Disease.
- Iso-immunization.
- Cephalo pelvic disorder.

The department course has been conducted in collaboration with the department of Obstetrics & Gynecology in Belfast, Dublin, Glasgow and Edinburgh.

One group is posted on duty in labor ward and admission department at least once weekly.

-BED SIDE TEACHING: By Teaching Staffs

-PRACTICE (SKILL LAB)

I- Obstetric history and examination

1. Obstetric history
2. Obstetric examination

II- Labor

1. First and second stage
2. Third stage and episiotomy

3. CTG

4. Partogram

III- Emergency

1. Shoulder dystocia.

2. Postpartum hemorrhage

3. Eclampsia

4. Acute pulmonary embolism

IV-Gynecology

1. Taking gynecological history

2. Speculum and biannual examination

3. Taking vaginal swab and cervical smear

4. Insertion and removal of intrauterine contraceptive device

REFERENCES:

- Ten Teachers Obs. & Gynae.
- Fundamentals of Obs. & Gynae.
- Illustrated Textbook of Obs. & Gynae.

FIFTH MEDICAL YEAR**MEDICINE**

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Principle of Medicine 4 th year	80	-	32	128	240
General and Special Medicine	160	100	185	751	1196

Course Objectives:

To teach the 4th and 5th years medical students in details about the following aspects:

- Brief review and assessment of anatomical aspects of different systems of the body.
- Review of the pathophysiology of diseases.
- Study in details different etiology of diseases.
- To provide students with knowledge and understanding of health and its promotion, and of diseases, its prevention and management, and to cover medical emergencies in the context of whole individual and his/her place in family and community.
- To enable the students to acquire and become efficient in basic clinical skills as history taking, physical and mental examination, interpreting diagnostic investigation and sharing treatment plan. The student should be competent in doing of a limited number of basic technical procedures.
- To enable the student to acquire and demonstrate attitudes necessary for achievement of high standards of medical practice including lifelong continuous medical education (CME).

Professional and Practical Objectives:

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

- Recognize normal anatomical landmarks.
- Take good history, to do complete physical examination, to recognize the diagnostic tools and investigations.
- Recognize urgent life-threatening conditions, and describe specific treatment.
- Use appropriate sterile technique, and safely do routine diagnostic and therapeutic procedures including life support.

Learning Outcomes:

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

- Describe basic anatomy and physiology.
- Determine medical symptomatology, discuss the common medical problems coming to doctors, their diagnosis, prevention and treatment, and to state the disease in the term of mental, functional and physical processes.
- State the clinical manifestations and differential diagnosis of common medical problems including early manifestations of serious diseases (e.g., malignancy) and emergencies.
- Identify the normal aging process, age related diseases and its treatment, and variable causes of disability.

Teaching & Learning Methods:

- Illustrated lectures: Large group plenary sessions in lecture theatres are time tabled, they set the scene for a topic, highlight important issues and arouse curiosity in relevant areas.
- Clinical rounds: Tutors demonstrate the core practical clinical skills and students practice these skills on patients under supervision for 3 hours daily.
- Problem based learning: To study written descriptions of clinical situations.
- Tutorial (small groups): For giving introduction, indications and interpretations of clinical laboratory tests, radiography and electrocardiography.
- Practical clinical technique: Focus on the development of practical skills appropriate to the clinical situation.
- Assignment (mini lecture): Each student completes a review on a selected topic and delivered in a known dead time.
- Attendance with guidance (once weekly).

Student assessment methods:

- Mid-Term written exam to assess knowledge and intellectual skills.
- Final written exam to assess professional skills.
- Oral exam to assess knowledge and professional skills and attitude.

Assessment Tools:

Assignment. Written examination, Clinical cases examination, Oral exam, Log book, Training in medicine lasts for 28 weeks (10 weeks in the fourth year + 18 weeks in the fifth year) and it takes place in the Medical Departments of:

- Tripoli Medical Center.
- Alkhadra Hospital.
- Central Hospital.
- Tajoura Hospital (Cardiology).
- Abusetta Hospital.
- Diabetic Center.
- Psychiatric Hospital.

FOURTH YEAR INTRODUCTORY COURSE:

It lasts 10 weeks divided as follows:

- 2 weeks – Introductory Lectures.
- 6 weeks – Bedside Teaching in General Medicine.
- 2 weeks – Dermatology.

The Introductory course covers:

- Lectures are covering all the systems, particularly cardiovascular system, gastrointestinal system, renal disorders, Lectures will be clinically oriented, practical, supplement to book reading rather than the replacement.
- Medical Ethics, responsibilities towards patients and their relatives, and the code of conduct in the hospital and with the patients.
- Approach in history taking and physical Examination in common conditions like anemia, oedema, paralysis, fever, jaundice, headache, wheezing, chest pain, abdominal pain, weight loss, polyuria, painful extremities.
- Bedside practice of physical examination in small groups to acquire reasonable skill in it.

- At the end of the fourth year, the student is expected to have reasonable proficiency in history taking, clinical examination and case presentation.

FIFTH YEAR TEACHING AND TRAINING MEDICINE

It lasts 18 weeks and covers the different sub-specialties in medicine.

The fifth-year course consists of:

1. Lectures:

Students will have to attend a weekly lecture at the Faculty of Medicine.

2. Bedside teaching, which specialties in medicine as Dermatology, Cardiology, Gastroenterology, Endocrinology and diabetes, Respiratory, Oncology and Hematology, Rheumatology, Neurology, Nephrology, Radio-diagnosis, Radiology, Laboratory and Psychiatry.

This is held daily for four hours.

3. Tutorials:

Students will have to attend a tutorial every day after the bedside teaching for one hour in their training place.

This starts daily from 8:30 a.m. to 12:30 p.m.

Students will be encouraged to take in the follow-up and management of the patients in their periods of posting in the wards. As well as attending the management of emergency cases in the casualty.

They will also be encouraged to attend the teaching program of the Interns and of visiting Professors/Consultants.

Near the end of the term, there will be the intensive course (revision). There will also be the special sessions for X-rays, ECG and laboratory Procedure, and museum display for X-rays, ECG and instruments will also be arranged.

SYLLABUS:

Cardiovascular:

- Rheumatic fever.
- Infective endocarditis.
- Ischemic heart disease.
- Systemic hypertension.
- Cor Pulmonale.
- Pulmonary embolism.
- Arrhythmia.
- Heart failure.
- Pericarditis.
- Large vessel disease.
- Cardiovascular drugs.
- Cardiomyopathies.
- Congenital heart disease.

Respiratory system:

- Diseases of the pleura.
- Chronic bronchitis and bronchial asthma.
- Emphysema.
- Pneumonias.

- Bronchiectasis.
- Lung abscess.
- Pulmonary TB.
- Drug induced pulmonary disease.
- Mediastinal syndrome.
- Adult respiratory distress syndrome.
- Respiratory failure.
- Bronchial carcinoma.
- Occupational lung disease.

Infections:

- Enteric fevers.
- Brucellosis.
- Meningitis.
- Schistosomiasis.
- Amebiasis.
- Malaria.
- Infectious mononucleosis.
- Cytomegalovirus.
- Cholera.
- Plague
- Toxoplasmosis.
- PUO.
- Rabies.
- Diagnosis of parasitic diseases.
- Filariasis.
- Fascioliasis.
- Measles, mumps, Influenza.
- Sexually transmitted diseases:
- HIV.
- Syphilis.
- Gonorrhea.
- Non-gonococcal urethritis.
- Cancroids, lymphogranuloma venereum, and granuloma inguinale.

Clinical pathology:

- Leukocyte disorders & leukemias.
- Hemostatic disorders.
- Blood transfusion.
- Red cell disorders and anemias.
- Clinical enzymology Organ functions Endocrine functions.
- Metabolic disorders of carbohydrate, lipids& proteins.

Histopathology.**Clinical Chemistry and laboratory Diagnostics:**

- Acid base.
- Mineral metabolism.

- Tumor markers.
- CSF, Transudate & Exudate.
- Clinical Chemistry.
- Endocrinology.
- Urine Pregnancy Testing.
- Urine Test (Urinalysis).
- Stool Test.
- Blood Gases.
- Therapeutic Substance Monitoring.
- Cytohematology.
- Cellular Hematology.
- Coagulation Test.
- Immunology testing.
- Toxicology (Forensic Toxicology and Drug Analysis).

Immunology:

- Immunodeficiency.
- Hypersensitivity.
- Autoimmunity.

Clinical Microbiology:

Bacteremia & septicemia.

Neurology:

- Introduction.
- The cranial nerves.
- Hemiplegia.
- Vascular occlusive disorders.
- Paraplegia.
- Cauda Equina.
- Neurogenic bladder disorders.
- Peripheral neuritis.
- Myopathies.
- Spondylitis.
- Sciatica.
- Motor neuron disease.
- Subarachnoid hemorrhage.
- Ataxia.
- Extra-pyramidal syndromes.
- Space-occupying lesions.
- Headache and migraine.
- Epilepsy.
- Coma.
- Speech.

Psychiatry:

- Introduction; terms definitions.
- History & examination.

- Schizophrenia and related disorders.
- Delusional disorders & other types of psychosis.
- Affective disorders.
- Neurotic disorders.
- Personality disorders.
- Somatoform disorders.
- Mental disorders due to general medical conditions.
- Organic syndromes.
- Disorders of eating, sleeping and psychosexual functions.
- Substance related disorders.
- Treatment in psychiatry.

Psychosomatic Medicine and Psychotherapy:

- History of psychosomatics
- Psychosomatic disorders
- Treatment of psychosomatic disorders

GIT & Hepatology:

- Diseases of the mouth.
- Diseases of the esophagus.
- Diseases of the stomach & duodenum.
- Peptic ulcer.
- Gastrointestinal malignancy.
- Diseases of the small intestine.
- Malabsorption syndrome.
- Diseases of the large intestine.
- Diseases of the pancreas.
- Diseases of the peritoneum.
- Diarrheas and dysenteries.
- Gall bladder diseases.
- Functional colonic disorders.
- Inflammatory bowel disease.
- Disorders of GI motility.
- Jaundice.
- Acute hepatitis.
- Chronic hepatitis.
- Cirrhosis.
- Portal hypertension.
- Upper GI bleeding.
- Hepatocellular failure.
- Liver transplantation.
- Helminthes infection.

Hematology/Oncology:

- Hematopoiesis.
- Iron deficiency anemia.
- Sideroblastic anemia.
- Megaloblastic anemia.
- Hemolytic anemia.

- Polycythemia
- Multiple myeloma.
- Leukemias.
- Lymphoma.
- Myeloproliferative disorders.
- Bleeding and clotting disorders.
- Spleen.
- Blood transfusion.
- BM transplantation.
- Thrombophilia.
- Lymphadenopathy.

Transfusion medicine:

- Blood Group (Rh) Incompatibility.
- Transfusion of blood.
- Blood components.
- Blood bank.
- Clinical laboratory.
- Management of Blood Incompatibility.
- Immunohematology.
- Stem cell collection.
- Cellular therapy.
- Coagulation.

Nephrology:

- Structure and function.
- Major clinical syndromes in nephrology.
- Acute renal failure.
- Chronic renal failure.
- Nephrotic syndrome.
- Nephritic syndrome.
- Interstitial and tubular disease.
- Diabetic nephropathy.
- Drug nephrotoxicity.
- Water, electrolyte and acid base balance.
- Renal replacement therapy.
- Kidney in systemic diseases.
- Obstructive nephropathy.
- Investigations of renal disease.
- Tumors of the urinary tract.

Rheumatology:

- Rheumatoid arthritis.
- Systemic lupus erythematosus.
- Scleroderma.
- Sjogren's syndrome.
- Polymyalgia rheumatic.
- Behcet's syndrome.
- Polymyositis and dermatomyositis.

- Mixed connective tissue disease.
- Seronegative spondyloarthropathies.
- Osteoarthritis & Osteoporosis.
- Infective arthritis & Reactive arthritis.

Endocrinology & Metabolism:

- Acromegaly and other pituitary tumors.
- Sheehan's and other hypopituitary disorders.
- Stunted growth.
- Diabetes insipidus and SIADH.
- Diseases of thyroid gland.
- Hyperparathyroidism and metabolic bone disease.
- Tetany and calcium homeostasis.
- Cushing syndrome.
- Addison's.
- Pheochromocytoma.
- Obesity.
- Diabetes.
- Hypoglycemia.
- Dyslipidemias.
- Vitamins.
- Nutritional deficiency.
- Gonadal disorders.

Geriatric medicine:

- Effect of aging on body systems.
- CVS disorders in the elderly.
- Diabetes in the elderly.
- Hypertension in the elderly.
- Falls.
- Cognitive disorders in the elderly.
- Delirium in the elderly.
- Senile osteoporosis.
- Urinary incontinence.
- Prescribing for the elderly.

Genetics:

- Nucleic acids.
- Recombinant DNA technology.
- Chromosomal abnormalities.
- Regulation of gene expression.
- Immunogenetics.

Ethics and Law:

- Informed consent.
- Life, Death, Dying and Killing.
- Organ transplantation.

- Refusal of treatment.
- Autonomy.
- Confidentiality and good clinical practice.

Dermatology and Venereology:

- Function & structure of normal skin.
- Bacterial skin diseases.
- Fungal skin diseases.
- Viral skin diseases.
- Hair disorders.
- Facial dermatosis (Acne, Rosace).
- Disorders of pigmentation.
- Papulo-squamous disease.
- Auto immune vesiculo-bullous diseases.
- Eczema.
- Urticaria.
- Myobacterium skin diseases; T.B. & Leprosy.
 - The cutaneous manifestation of connective tissue diseases; SLE, Dermatomyositis & Scleroderma.
- Ecto-Parasite skin infestation disease.
- Geno-Dermatosis.
- Skin tumor.
- Erythema; E.N., E.M. & Sweat Syndrome.

Sexually Transmitted Disease (Venereology):**Classification and Cause:**

- Bacterial:
 - Chancroid (*Hemophilus ducrey*).
 - Chlamydia (*Chlamydia trachomatis*).
 - Granuloma inguinale or (*Klebsiella granulomatis*).
 - Gonorrhea (*Neisseria gonorrhoeae*), colloquially known as "the clap".
 - Syphilis (*Treponema pallidum*).
- Viral:
 - Viral hepatitis (Hepatitis B, C, A virus).
 - Herpes simplex.
 - HIV.
 - Human papillomavirus HPV.
- Fungal:
 - Candidiasis (yeast infection).
- Pathophysiology.
- Prevention.
- Vaccines.
- Condoms.
- Diagnosis.
- Management.
- Epidemiology.

Hygiene and Sterilization:

- Concept of hygiene.
- Medical hygiene.
- Hand and body hygiene.
- Medical hygiene at home.
- Disinfectants and antibacterials in home hygiene.
- Personal hygiene.
- Excessive body hygiene and allergies.
- Excessive body hygiene of skin.
- Personal service hygiene.
- Individual hygiene.
- Environmental Hygiene.
- Hospital Hygiene.
- Infectious Diseases.
- Prevention and control of infections and contamination.
- social Hygiene.
- Public health.

Family Medicine:

- Functions and features of Family Medicine.
- House and family medical function.
- Disease prevention.
- Health education.
- Screening measures.
- General medical care of patients.
- Functions in social Area.
- Social support.
- Rehabilitation.
- Maternal and child health.
- Maternal morbidity and mortality, Breast feeding.
- Expanded programmed on immunization.
- Childhood morbidity and mortality.
- Integrated management of child illness.
- School health, Geriatric health & Adolescent health.

General and Clinical Radiology:**A. Introduction to Radiology****▪ RADIOLOGICAL ANATOMY**

- CNS anatomy.
- Chest anatomy.
- GIT and HBS

▪ RADIOLOGICAL PHYSICS

- Conventional physics.
- MRI physics.
- CT physics.
- USS and Doppler physics.
- Radiation Protection.

B. DIAGNOSTIC RADIOLOGY**CENTRAL NERVOUS SYSTEM IMAGING**

- Imaging pt. with CVA.
- Cerebral Infarction.
- Brain tumors and metastasis.
- Neurodegenerative diseases.

FACE AND NECK IMAGING

- Disease of the Nose and Sinuses.
- Disease of the Ears.
- Injuries and Diseases of the orbit.
- Disease of the neck

CARDIOVASCULAR AND INTERVENTIONAL RADIOLOGY

- Interventions in vascular disease.
- Congenital heart disease.
- Coarctation of Aorta and Aortic Dissection.
- Imaging of Vascular disease
- Tissue biopsies.

CHEST RADIOLOGY

- Analysis of chest radiograph.
- Opacities in the Lung.
- Acute Pulmonary changes.
- Lesions in the Mediastinum.
- Enlargement of the Hila.
- Pleural disease

GENITOURINARY TRACT RADIOLOGY

- Renal Ultrasound.
- Renal masses.
- Renal volume loss / Renal atrophy.
- Increase in renal volume.
- Renal calculi.
- Renal congenital anomalies.
- Renal trauma.
- Adrenal tumor

GASTROINTESTINAL RADIOLOGY

- Analysis of Abdominal Radiography.
- Imaging of acute abdomen.
- Disease of Esophagus and Stomach.
- Disease of Liver and Hepatobiliary system.
- Disease of Pancreas and Spleen.
- Disease of Bowel.

BONE AND SOFT TISSUES IMAGING

- Analysis of a bone image.
- Disease of the Bone.
- Disease of the Joints.
- Fracture and Dislocation.
- Soft tissue tumors.
- Imaging of spine disease

Obstetrics and Gynecology Radiology

- Obstetrics Ultrasound.

- Gynecological disease.
- Child pelvic mass

B-RADIOTHERAPY

- CNS Tumors
- GIT Tumors
- Lung Tumors
- Genitourinary Tract and Pediatric tumors
- Head and Neck Tumors

C- NUCLEAR MEDICINE

- Physical principles of nuclear medicine
- Commonly used nuclear medicine procedures (Bone scintigraphy, myocardial scintigraphy,
- Renal scintigraphy (dynamic and static), Hepatobiliary scintigraphy,
- Endocrine Scintigraphy

TUTORIALS

A-DIAGNOSTIC RADIOLOGY

- MSK Anatomy
- Opacities in the Lung
- Analysis of Chest radiograph
- Analysis of abdominal radiograph
- Imaging Patient with Jaundice and Liver cirrhosis
- Imaging of acute abdomen
- Imaging of intestinal obstruction
- Imaging pediatric abdominal masses
- Imaging pt. with CVA
- Imaging of the brain tumor
- Imaging neck masses
- Imaging of bone tumor
- Imaging of vascular disease

B-RADIOTHERAPY

- Gynecological and breast Tumors
- Principles of Radiotherapy
- Oncological Emergencies and Palliative Radiotherapy
- Management of Cancer patients
- Lymphomas

C-NUCLEAR MEDICINE

- Palliative pain therapy for patients with disseminated bone metastases (e.g. Rhenium-188, Rhenium 186, Strontium-89 and Samarium-153) Emergency nuclear medicine: GIT Bleeding, Lung scintigraphy (ventilation and perfusion).
- Radioimmunoassay, Immunoradiometric assay and schilling test Radio synoviorthesis (radiation synovectomy of large, middle and small joints)
- Bone Densitometry (Bone mineral measurement) by using Dual energy X-ray absorptiometry (DXA scan).
- Positron Emission tomography (PETscan)

CLINICAL TEACHING

TEACHING AND LEARNING METHODS:

- Lectures.
- Tutorials. (Case presentation & small group discussion).
- Practice daily work.
- Clinical bedside teaching.

Case Scenarios and Tutorial:

Case Scenario and Tutorial in CVS

- Patient with syncope
- Patient with chest pain
- CPR
- CARDIOGENIC SHOCK
- D/D of lower limb edema
- Cardiac murmurs
- Patient with dyspnea
- Hyper tension
- Patient with palpitation
- Patient with PND and orthopnea
- ECG1
- ECG2
- ECG3
- ECG4

Case Scenario and Tutorial in Respiratory:

- Patient with chest pain
- Patient with hemoptysis
- Patient with chronic cough
- Patient with acute cough and fever
- Patient with wheeze
- Patient with dyspnea
- Patient with sleep/ breathing problem
- ABG

Case Scenario and Tutorial in CNS:

- Localization of CNS Lesions
- gait disorders
- patient with headache

Case Scenario of Common Psychiatric Disease:

- Mania
- Depression
- Anxiety neurosis
- Schizophrenia
- S/E of psychiatric drugs

Case Scenario and Tutorial in GIT:

- Patient with nausea& vomiting
- patient with abdominal pain
- Jaundice
- bloody diarrhea
- constipation
- patient with dysphagia
- patient with dyspepsia
- Hematemesis
- Melena
- patient with anemia and diarrhea (Malabsorption)

Case Scenario and Tutorial in Transfusion medicine:

- Patient with anemia
- Patient with lymphadenopathy
- Patient with bleeding tendency
- Interpretation of CBC
- Blood transfusion

Case Scenario and Tutorial in Nephrology:

- Anuria and oliguria
- Approach to hematuria, proteinuria and renal function

Case Scenario and Tutorial in Rheumatology:

- Approach to painful joints
- D/D of recurrent oral ulcers
- D/D of crystal induced arthropathy
- Biological treatment (immunological base)

Case Scenario and Tutorial Endocrinology:

- Approach to patient with neck swelling
- Polyuria and polydipsia
- Patient with decreased appetite and weight gain
- Patient with increased appetite and weight loss
- Obesity (D/D of endocrine disorders)
- Patient with symptoms of hypoglycemia

Tutorial Dermatology and Sexually Transmitted Disease:

- History and examination
- D/D of alopecia (primary & secondary)
- D/D of hyper pigmentation
- D/D of papulo- squamous disease
- Types of eczema
- Urticaria
- Erythema, EN, EM& sweat disease
- The cutaneous manifestation of C.T.D(SLE & Dermatomyositis)
- Cutaneous manifestation of scleroderma

- Discoid lupus erythematosus
- Candidiasis
- Management of lichen planus
- D/D of hypopigmentation
- Leishmaniosis types & management
- Nail disorders (differential diagnosis)
- Cutaneous manifestations of granulomatous disease

Emergency Medicine:

- Respiratory failure.
- Status asthmatics.
- Shock.
- Cardiopulmonary resuscitation.
- Status epileptics.
- Stupor and coma.
- Diabetic emergencies.
 - DKA
 - Hyperosmolar diabetic coma
 - Hypoglycemia
- Endocrine emergencies and Adrenal crisis
- Acid- Base and electrolyte disturbances.
- GIT bleeding and Hematemesis.
- Hepatic failure.
- Drugs and substance poisoning

Tutorial

- D/D of coma
- D/D of acute chest pain
- Medical causes of acute abnormal pain
- Use of Seng-Staken tube
- Endotracheal intubation (indication & mechanism of insertion)
- Ventilators (types & indication of use)
- Hypothyroidism (myxedema coma)
- Thyroid storm
- Hypothermia
- Causes of hypotension
- Pulmonary hemorrhage
- Acute pulmonary edema
- Septicemia and septic shock
- Sclerotherapy (definition & indication)
- Pacemaker (insertion in Emergency)
- Treatment of arrhythmias in ICU
- Central venous line and monitoring of CVP.
- NG tubes (uses in emergency situations).

Medical Skills Lab

- Respiratory system examination
- Cardiovascular system examination
- Abdominal examination

- Central nervous system examination
- Rheumatology skill lab
- Medical emergency skills
- Monitoring and therapeutic skills.

REFERENCES:

- Handout of lectures.
- Davidson's Principles and practice of medicine.
- Clinical medicine; Kumar & Clark.
- 1000 MCQs for Davidson's Principles and practice of medicine.
- MCQs for Clinical medicine; Kumar & Clark.
- Hutchison's clinical methods.
- Clinical examination; Macleod & Munro.
- A guide to physical examination; Barbara Bates.

SURGERY

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Principle of Surgery 4th year	80	-	32	128	240
General and Special Surgery	200	150	183	753	1286

Objectives of Course:

The objectives of the course are:

- To provide the student with the appropriate knowledge, and skills, which enable him/her to obtain a detailed history from patients with surgical problems, to carry out a proper clinical examination, and to define the appropriate management plan.
- To provide the student with the knowledge and skills needed for initial management of various surgical emergencies, and poly-traumatized patient.
- To provide the student with an appropriate background covering various general surgical, vascular, cardiothoracic problems at various age groups.
- To provide the student with the required knowledge, and skills to detect cancer at an early stage and to show the plan of management for various stages of the disease.
- To provide the student with the principles of medical ethics, evidence based surgical practice and lifelong learning.

Professional and Practical Objectives:

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

- Recognize patients with life/organ-threatening surgical conditions and perform appropriate initial therapy.
- Identify and outline management of patients with chronic surgical conditions requiring long-term follow-up, rehabilitation and pain relief.
- Perform routine bedside procedures.
- Apply the principles of sterile techniques and infection control guidelines.
- Monitor the effectiveness of therapy by identifying clinical and investigative parameters that can be used in assessing the patient's response to treatment and reevaluate management plan accordingly.
- The student should be able to choose the proper investigations related to the patient condition including different laboratory and radiological modalities to reach the diagnosis.
- The student should acquire skill in basic technical procedure such a Basic life support (BLS), advanced life support (ALS), Air way management & oxygenation (mask ventilation & endotracheal intubation) and Insertion of IV line.

Learning Outcomes:

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

- Describe the surgical anatomy of important regions, organs and structures of body.
- Describe the etiology, pathogenesis and pathology of important and/ or common surgical diseases.
- Discuss the clinical manifestations, complications, diagnostic modalities, outcome and management plans for common and/or important surgical problems, with special emphasis on emergencies and malignancies.

- Explain the methods of screening and early detection of cancer.
- Recognize the ethical principles that govern decision-making in surgical practice.
- Discuss the principles and practice of preoperative preparation and postoperative care.
- Identify the surgical instruments and their uses, and the different types of catheters, suture materials and meshes.
- Describe the types of surgical incisions and the basic steps of common surgical procedures.
- To emphasis on theoretical & clinical knowledge, diagnosis & management of chest trauma.
- To know surgical management of pulmonary T.B. and Surgical management of thoracic tumors.
- To have a comprehensive overview of principles of cardiac surgery & surgical management of cardiac diseases.
- To have a theoretical & clinical knowledge as well as diagnosis & surgical management of thoracic infections.
- To be familiar with the common diseases, which affect the brain and nervous system, the common & important neurosurgical diseases and emergencies their complications and management.
- Outline the physiologic effects of pain and the principles of its management.
- To have an idea about local anesthesia.
- To have an idea about Management of unconscious patient, Cardiopulmonary resuscitation and Management of hypoxic & hypotensive patient.

Teaching and Learning Methods:

- Lectures covering etiopathology, signs and symptoms, differential diagnosis, investigations required to arrive at diagnosis, management plan including operative plan and /or Radiotherapy and chemotherapy, preoperative workup of the patient, post operative management including complications of non-malignant and malignant diseases, cancer screening, prophylaxis.
- Lectures on basic surgical principals like wound healing, post operative management of fluids, nutrition, electrolyte, coagulation parameter monitoring and management.
- Lectures on identification, diagnosis and management of various vascular system problems, including venous, arterial and lymphatic system.
- Bedside teaching about proper and appropriate history taking, recognizing various disease specific symptoms, eliciting various signs and conducting relevant examination, in addition video viewing on clinical methods and viewing of various steps of surgeries on video media and actual demonstration of various surgical steps in OR.
- Demonstrating various radiological signs on appropriate x rays and CT scans.
- Identification characteristics and proper usage of various surgical instruments including laparoscopic equipment and instruments.
- Organization of tutorials on specific topics.
- Group discussion and surgical problem solving.
- General club with discussion on strong and weak points on particular study.
- Clinical rounds.

Assessment Tools:

Assignment. Written examination, Clinical cases examination, Clinical exam, Log book, Training in medicine lasts for 28 weeks (10 weeks in the fourth year + 18 weeks in the fifth year) and it takes place in the Surgical Departments of:

- Central Hospital.
- Tripoli Medical Center.
- Alkhadra Hospital.
- Abusalim Trauma Hospital.

Fourth Year Introductory Course:

It lasts 10 weeks divided as follows:

- 2weeks–Introductory Lectures.
- 6weeks–Bedside Teaching in General Surgery.
- 2weeks–Trauma Surgery.

The Introductory course covers:

- Lectures are covering principles of surgical care, patient safety, patient centered care, and team work, evidence-based practice, consent, and medico legal aspects of surgical care.
- Understand the principles of surgical practice and how to use them in day to day care of post-surgical patients.
- Medical Ethics, responsibilities towards patients and their relatives, and the code of conduct in the hospital and with the patients.
- Approach in history taking and physical Examination in common Surgical conditions.
- Identify the common laboratory investigations, diagnostic imaging and basic instruments, and devices used in surgical care.
- Bedside practice of physical examination in small groups to acquire reasonable skill in it.
- At the end of the fourth year, the student is expected to have reasonable proficiency in history taking, clinical examination and case presentation.

Fifth Year Teaching and Training Surgery

It lasts 18 weeks and covers the different specialties in General and Special Surgery. The fifth year course consists of:

1.Lectures:

Students will have to attend a weekly lecture at the Faculty of Medicine.

2.Bedside teaching, which specialties in surgery as General surgery, Orthopedic surgery, Plastic surgery and burn, Cardiovascular surgery, Head and neck surgery, Urology, E.N.T, Anesthesia, Pain Medicine, Palliative care, Pediatric surgery, Neurosurgery, Thoracic surgery.

This is held daily for four hours.

3.Tutorials:

Students will have to attend a tutorial every day after the bedside teaching for one hour in their training place.

Students will be encouraged to take in the follow-up and management of the patients in their periods of posting in the wards. As well as attending the management of emergency cases in the casualty.

They will also be encouraged to attend the teaching program of the Interns and of visiting Professors/Consultants.

Near the end of the term, there will be the intensive course (revision). There will also be the special sessions for X-rays, CT scan, MRI and Emergency Cases.

SYLLABUS:**Surgery Lectures**

- Course introduction, principles of surgical care, patient centered care, patient safety, team work and evidence-based practice.
- Role of surgery in life saving, treatment of disease, amelioration of suffering , health promotion screening, early detection and prevention of disease
- Medical ethics, professional standards, the consent process and medical documentation.
- Wounds, wound healing, management of wounds.
- Fluids and electrolytes in surgical patients
- Hemostasis types of hemorrhage, blood and blood products in surgery.
- Shock, types, pathophysiology and management of shock.
- Septic shock and sepsis syndrome.
- Metabolic response to surgery and injury.
- Nutritional support in surgical patients
- Surgical infections I: health care associated infections (HAI), surgical site infections, use and misuse of antibiotics
- Surgical infections II: skin infections, gas gangrene, tetanus, synergistic gangrene.
- Surgical infections III: specific infections, TB, leprosy, syphilis hydatid disease, parasitic infections of surgical importance.
- Sterilization and disinfection, use of antiseptics
- Preoperative preparation and post operative complications.
- Principles of surgical oncology, epidemiology, causes, grading, staging, tumor markers, diagnosis, treatment, follow up, prognosis, precancerous conditions , early detection, screening and prevention.
- Venous thromboembolism, DVT and pulmonary embolism.
- Palliative care.
- Organ transplantation.
- Trauma, epidemiology, causes, burden of trauma, disaster, war surgery and triage.
- Management of patients with multiple traumas.
- Abdominal injuries.
- Chest injuries.
- Vascular injuries and compartment syndrome
- Head injuries.
- Spinal injuries.
- Principles of fractures and dislocations, causes, types, diagnosis and complications.
- Principles of fracture treatment.
- Burns
- Salivary gland diseases.
- Neck swellings and conditions.
- Thyroid, benign diseases of thyroid.
- Thyroid, solitary nodule, thyroid malignancies.
- Parathyroid diseases and disorders of calcium metabolism.
- Diseases of adrenal gland, neuroendocrine tumors, MENI&MENII.
- Benign diseases of the breast and male breast.
- Carcinoma breast and other malignant breast conditions.
- Diseases of the venous system, varicose veins, post phlebitis leg and congenital

anomalies of venous system.

- Chronic limb ischemia.
- Acute limb ischemia, critical ischemia, gangrene and compartment syndrome.
- Vascular aneurysms.
- Foot ulceration and diabetic foot disease.
- Thoracic outlet syndrome and vasospastic conditions of the limbs.
- Diseases of the lymphatic system, lymphadenopathy, lymphedema, and DD of unilateral leg swelling.
- Benign diseases of esophagus, injuries, perforation, neuromuscular disorders, diverticula, hiatus hernia.
- Benign and malignant tumors of esophagus.
- Benign diseases of stomach and duodenum.
- Gastric carcinoma, duodenal tumors
- Gall bladder anatomy, diseases.
- Obstructive jaundice.
- liver, anatomy, infections, cysts and benign tumors
- liver tumors, tumors of gall bladder and biliary tree
- Portal hypertension. acute upper GIT bleeding.
- Diseases of the pancreas, acute pancreatitis, chronic pancreatitis, pancreatic cysts.
- Carcinoma of pancreas, endocrine tumors of the pancreas.
- Diseases of the spleen, splenomegaly, indications and complications of splenectomy.
- Diseases of the small bowel, tumors, intussusception, Meckel's diverticulum, infections of terminal ileum.
- Inflammatory bowel disease.
- Acute appendicitis, tumors of the appendix
- Diverticular disease of the colon, colonic infections of surgical importance.
- Ischemic colitis, radiation proctitis, IBS, polyps of colon and rectum.
- Intestinal obstruction.
- Colorectal carcinoma and premalignant conditions of colorectal carcinoma.
- Anal canal anatomy and physiology, perianal conditions, piles, fissure and ulceration
- Peri anal infections, abscess, fistula and pilonidal sinus.
- Rectal prolapse, fecal incontinence, and pelvic dysfunction syndrome.
- Anal carcinoma and warts.
- Peritonitis and intraperitoneal sepsis.
- Intestinal ischemia.
- Lower GIT bleeding.
- Intestinal stomas and fistulas.
- Diseases of the mesentery, omentum and retroperitoneum.
- Abdominal wall hernias and diseases of the umbilicus.
- Principles of bariatric surgery.
- Management of abdominal masses in infancy and childhood.
- Tracheoesophageal fistula, congenital pyloric stenosis.
- Intestinal obstruction in infancy and childhood.
- Anorectal anomalies, congenital megacolon and constipation in children.
- Surgical emergencies in infancy and childhood.
- Diseases of the mediastinum, infections, cysts tumors and superior vena caval obstruction.
- Pleural diseases, empyema, chylothorax and tumors of pleura.
- Surgical aspects of carcinoma lung.
- Lung abscess, bronchiectasis, hydatid cyst of lung and tuberculosis of lungs.

- Regional and general anesthesia.
- Lumps of skin and subcutaneous tissue.
- Malignant skin tumors.
- Instruments, surgical photos and x-rays.
- Hematuria, injuries of the urinary tract.
- Urinary obstruction.

1. General surgery:

Salivary glands, Neck, Thyroid, Parathyroid gland, Lymphatic system, Arterial Disorders Venous Disorders, Abdominal wall and hernias, Breast, Stomach and duodenum, Liver Biliary system, Pancreas, Spleen, Peritoneum,omentum, and mesentery, Intestinal obstruction
Appendix, Small and large intestines, anal canal, Minima invasive surgery

Tutorial in General Surgery

Management of abdominal injuries, Management of acute abdomen, Management of upper gastro- intestinal bleeding, Management of bleeding per rectum, Management of multiple injured patients, Management of solitary thyroid nodule, Management of a breast lump, Common surgical operation, Common surgical instruments and tubing.

2. Plastic surgery and burn:

- Introduction.
- Face, lips and palate.
- Surgery of nerves.
- Disorders of muscles, tendons and fascia.
- Hand infection and Hand injuries.
- Burn management.
- Dental, Oral and Maxillofacial Diseases.

3. Cardiovascular surgery:

- Arterial injuries; Acute ischemia; Occlusive arterial disease includes aneurysms.
- Venous system.
- Lymphatic system and lymph nodes.
- Acquired heart disease:
- Coronary artery disease.
- CABG.
- Aortic stenosis.
- Aortic insufficiency.
- Mitral stenosis.
- Mitral regurgitation
- Congenital heart disease: VSD, PDA, Fallot tetralogy.
- Diseases of great vessels:
- Aortic aneurysm.
- Aortic dissection.

4. Head and neck surgery:

- Mouth, cheek and tongue.
- Teeth gums and jaws.

- Salivary glands and neck.
- Pharynx and larynx.

5. Endocrine surgery:

- Thyroid.
- Parathyroid.
- Adrenal.

6. Breast surgery:

- Breast lesions including lumps, pain and nipple discharges.
- Carcinoma breast.

7. GIT and abdominal surgery:

- Abdominal trauma.
- Abdominal wall hernias.
- Endoscopic and laparoscopic surgery.
- Acute abdomen.
- Esophagus.
- Stomach and duodenum.
- Liver.
- Portal hypertension.
- Biliary system.
- Pancreas.
- Spleen.
- Small intestine.
- Large intestine.
- Appendix.
- Peritoneum, mesentery and omentum.
- Upper GI bleeding.
- Inflammatory bowel disease (IBD).
- The Anus.

8. Post operative and miscellaneous:

- Fluid therapy.
- Shock & Cardiac arrest.
- Blood transfusion.
- Postoperative pain relief.

9. Urology lectures:

- Signs and symptoms of urologic patient.
- Urologic investigations.
- Nonspecific infection of genitourinary tract.
- Specific infection of genitourinary tract.
- Urinary stones.
- Trauma of the kidney and ureter.
- Trauma of urinary bladder, urethra, pelvis, and external genitalia.
- Congenital anomalies of genitourinary tract.

- Tumors of the kidney, pelvis, and ureter.
- Tumors of the urinary bladder.
- Benign prostatic hypertrophy.
- Carcinoma prostate.
- Testicular tumors.
- Acute scrotum.
- Urethral stricture.
- Vesicoureteric reflux and pelviurteric junction obstruction.
- Scrotal swelling, undescended testis and varicocele.
- Hematuria.
- Urine retention and urine incontinence.

10. E.N.T. lectures:

- The ear; Anatomy and physiology, Diseases of external ear.
- Diseases of the middle ear; Congenital anomalies, Acute otitis media.
- Chronic otitis media.
- Non suppurative otitis media.
- Diseases of the inner ear; inflammation and Monier's disease.
- Bell's palsy.
- The nose; Anatomy and physiology, Trauma.
- Acute and chronic rhinitis.
- Sinusitis.
- Nasal allergy and polyps.
- Diseases of the nasal septum.
- Tumors of the nose and paranasal sinuses.
- The pharynx; Anatomy, Congenital anomalies, Acute pharyngitis.
- Chronic pharyngitis, Ulcers of the mouth cavity.
- Tonsils.
- Adenoid.
- Suppurations of the pharynx.
- Tumors of the pharynx.
- The larynx; Anatomy, Congenital anomalies, and Trauma.
- Inflammations of the larynx.
- Tumors of the larynx.
- Vocal cords paralysis.
- Stridor and hoarseness of voice.
- Tracheostomy.

11. Anesthesia lectures:

- Introduction to anesthesia.
- Pre-operative evaluation.
- Pre-medication.
- Anesthetic Agents.
 - Intravenous Anesthetic
 1. Barbiturate (Thiopentone).
 2. Non- Barbiturate: (Propofol, Ketamine).
 - Inhalational Agents, Halothane, Isoflurane, Sevoflurane.
- MAC and factors which alter MAC.

- Muscle relaxant& Anticholinergic drugs& Cholinesterase inhibitors.
 1. Physiology of neuromuscular Transmission.
 2. Depolarizing Muscle relaxant.
 3. Non-Depolarizing Muscle relaxant.
 4. Anticholinergic drugs.
 5. Cholinesterase inhibitors.
- Conduct of Anesthesia.
- Intubation and Anatomy of the Airway and Anesthesia apparatus.
- Monitoring in Anesthesia.
- Induction agents; I.V., inhalational, muscle relaxant.
- Regional anesthesia; spinal, epidural, peripheral nerve blocks.
- Post-operative anesthetic complications.
- CPR; Resuscitation.
- Shock.
- Blood transfusion.
- Anesthetic machine and instruments.

12. Pain Management:

- Fundamentals of pain medicine, biology and types of pain, assessment methods and core pharmacologic treatment treatments like NSAIDs, opioids and adjuvants.
- Chronic pain conditions and non-pharmacologic therapies.
- Special topics: Ethical considerations, special population groups e.g. pediatrics, elderly, oncology and Palliative care.

13. Orthopedic surgery:

I. GENERAL:

- A. Introduction to orthopedic patient:** special points in history, clinical examination and investigations including imaging.
- B. Bone and joint infection:**
 1. Septic arthritis (causes, pathology, diagnosis, treatment and complications including Tuberculosis).
 2. Osteomyelitis (causes, pathology, diagnosis, treatment and complications including Tuberculosis).
- C. Non infective arthritis:** types, general features, causes, pathology, diagnosis, treatment and complications.
- D. Congenital and developmental disorders:**
 1. General introduction.
 2. DDH (pathology, diagnosis, treatment and complications).
- E. Metabolic and generalized bone diseases:**
 1. Physiology of calcium metabolism.
 2. Rickets.
 3. Osteomalacia.
 4. Achondroplasia.

5. Osteogenesis imperfect.
6. Paget's disease.
7. Neurofibromatosis.

F. Connective tissue disorders (skeletal dysplasia).

G. Biomechanics and mechanical disorders.

H. Neurological disorders affecting musculoskeletal system:

1. Poliomyelitis (pathology, clinical features and principles of treatment).
2. Cerebral palsy (pathology, clinical features and principles of treatment).
3. Spinal bifida (pathology, clinical features and principles of treatment).
4. Peripheral nerve lesion (pathology, clinical features and principles of treatment).

I. Musculoskeletal tumors:

1. Classification:

a. Benign:

- I. Non-ossifying fibroma.
- II. Osteoid osteoma.
- III. Osteoblastoma.
- IV. Osteochondroma.
- V. Chondroblastoma.
- VI. Cystic lesions (simple bone cyst and aneurysmal bone cyst).
- VII. Giant cell tumor.
- VIII. Lipoma.
- IX. Hemangioma.
- X. Schwannoma and Myxoma.

b. Malignant:

- I. Osteosarcoma.
- II. Chondrosarcoma.
- III. Fibrosarcoma.
- IV. Liposarcoma.
- V. Ewing's sarcoma.
- VI. Synovial sarcoma.
- VII. Epithelioid sarcoma.
- VIII. Chordoma and Adamantinoma.

2. Pathology.
3. Clinical presentation.
4. Diagnosis including investigations.
5. Principles of treatment.

II. ORTHOPAEDIC DISORDERS AND PRINCIPLES OF TREATMENT:

A. Conservative: rest, support, physiotherapy, drugs, manipulations and radiotherapy.

B. Operative: synovectomy, osteotomy, arthroplasty, arthrodesis, bone grafting, tendon transfer, tendon grafting and limb length equalization.

C. Osteosynthesis.**III. BONE FRACTURES AND PRINCIPLES OF TREATMENT:****A. Introduction to fractures and dislocations and principles of treatment:**

1. Definition of fracture.
2. Classification of fracture.
3. Pathology of fracture.
4. Healing of fracture.
5. Clinical and radiological diagnosis of fractures.
6. Clinical and radiological diagnosis of union.
7. Joint injuries.
8. Special features of fractures in children.
9. Initial treatment including first aid and resuscitation.
10. Principles of reduction methods (close and open).
11. Principles and indications of immobilization (conservative and operative methods).
12. Principles of rehabilitation.
13. Principles of treatment of open fractures.

B. Fracture complications and their management:

1. General:
 - a. Thromboembolism.
 - b. Fat embolism.
 - c. Chest infection.
 - d. Bed sores.
 - e. Urinary tract infection and urinary calculi.
2. Related to associated injury:
 - a. Vascular injury and compartment syndrome: pathology, clinical features, diagnosis and principles of treatment.
 - b. Nerve injury: pathology, clinical features, diagnosis and principles of treatment.
 - c. Tendon injury: pathology, diagnosis and treatment.
 - d. Visceral injury.
3. Related to fracture:
 - a. Infection: pathology and treatment.
 - b. Delayed and non-union: causes and treatment.
 - c. Mal-union and shortening: causes and treatment.
 - d. Avascular necrosis: pathology, sites, diagnosis and treatment.
 - e. Intra and peri-articular adhesions.
 - f. Post-traumatic ossification.
 - g. Sympathetic dystrophy.
 - h. Degenerative arthritis.
4. Factors affecting rate of healing.

IV. THE SHOULDER:

A. Disorders of the shoulder: causes, presentation, diagnosis, investigations and treatment of:

1. Painful arc syndrome.
2. Frozen shoulder.
3. Recurrent shoulder dislocation.

B. Fractures and dislocations around the shoulder: principles of diagnosis, treatment and complications of:

1. Fracture of the clavicle.
2. Fracture of the scapula.
3. Sternoclavicular joint injuries.
4. Acromioclavicular joint injuries.
5. Shoulder dislocation.
6. Fracture of the proximal humerus.
7. Fracture of the shaft of the humerus.

V. THE ELBOW AND FOREARM:

A. Disorders of the elbow: causes, presentation, diagnosis, investigations and treatment of:

1. Cubitus varus and valgus.
2. Tennis elbow.
3. Olecranon bursitis.
4. Ulnar neuritis.

B. Fractures and dislocations around the elbow and forearm: principles of diagnosis, treatment and complications of:

1. Supracondylar fracture of the humerus.
2. Fractures of the humeral condyles.
3. Fractures of the humeral epicondyles.
4. Fracture of the olecranon.
5. Fracture of the coronoid.
6. Fracture of the head of radius.
7. Dislocation of elbow.
8. Dislocation of head of radius.
9. Pulled elbow.
10. Fractures of the both bones of the forearm, including Monteggia and Galeazzi fracture dislocation.

VI. HAND AND WRIST:

1. **Disorders of the hand and wrist:** causes, presentation, diagnosis, investigations and treatment of:
2. Carpal tunnel syndrome.
3. Ganglion.
4. De Quervain's disease.
5. Digital stenosing tenosynovitis.
6. Dupuytren's contracture.

7. Kienbock's disease.

B. Fractures and dislocations around the hand wrist: principles of diagnosis, treatment and complications of:

1. Fractures of the lower end of radius:
 - a. Colles' fracture.
 - b. Smith's fracture.
 - c. Barton's fracture.
 - d. Epiphyseal injury.
2. Fracture of the scaphoid.
3. Fractures of other carpal bones.
4. Dislocations of carpal bones.
5. Fracture of the base of first metacarpal bone.
6. Fractures of other metacarpal bones.
7. Fractures of the phalanges of the hand.
8. Dislocations of the metacarpophalangeal and Interphalangeal joints.

VII. THE SPINE:

A. Disorders of the spine: causes, presentation, diagnosis, investigations and treatment of:

1. Cervical spine disease.
2. Low back pain, lumbar disc disease, spinal stenosis and lumbar fusion.
3. Scoliosis and Kyphosis.
4. Spondylolysis and Spondylolisthesis.

B. Spinal trauma: principles of diagnosis, treatment and complications.

VIII. HIP AND PELVIS:

A. Disorders of the hip: causes, presentation, diagnosis, investigations and treatment of:

1. Perthes' disease.
2. Slipped capital femoral epiphysis.
3. Coxa vara and valga.
4. Transient synovitis.
5. Osteoarthritis.

B. Fractures and dislocations around the hip and pelvis: principles of diagnosis, treatment and complications of:

1. Isolated fracture of the pelvis.
2. Fractures with disruption of pelvic ring.
3. Anterior and posterior hip dislocations.
4. Hip fracture dislocation: anterior, posterior and central.
5. Fractures of the neck of femur.
6. Fractures of the trochanteric region.
7. Fractures of the shaft of femur.

IX. THE KNEE:

A. Disorders of the knee: causes, presentation, diagnosis, investigations and treatment of:

1. Knee deformities.
2. Popliteal cysts.
3. Intra-articular loose body.
4. Patellar dislocation.
5. Osgood Schlatter's disease.
6. Osteoarthritis.

B. Fractures and dislocations around the knee: principles of diagnosis, treatment and complications of:

1. Supracondylar fracture of the femur.
2. Fractures of the femoral condyles.
3. Fractures of the patella.
4. Dislocation of the knee.
5. Ligamentous injuries.
6. Meniscal injury.
7. Fractures of tibial condyles.

X. LEG, ANKLE AND FOOT:

A. Disorders of the foot: causes, presentation, diagnosis, investigations and treatment of:

1. Pes cavus.
2. Pes planus.
3. Hallux valgus.
4. Painful heel.
5. Metatarsalgia.

B. Fractures and dislocations around the leg ankle and foot: principles of diagnosis, treatment and complications of:

1. Fractures of shaft of tibia and fibula.
2. Fractures of malleoli.
3. Soft tissue injuries around the ankle.
4. Fractures of the talus.
5. Fractures of the calcaneus.
6. Injuries of the other tarsal bones.
7. Fractures of the metatarsal bones.
8. Fractures of the phalanges of the foot.
9. Dislocations of the metatarsophalangeal and Interphalangeal joints.

14. Pediatric surgery and anomalies of the gastrointestinal tract:

- a. Congenital anomalies.
- b. Thyroglossal duct cyst.
- c. Branchial cleft anomalies.
- d. Stridor.
- e. Cystic Hygroma.

- f. Aspirated foreign body.
- g. Tracheoesophageal malformation.
- h. Congenital diaphragmatic hernia.
- i. Inguinal hernia.
- j. Congenital pyloric stenosis.
- k. Meconium ileus.
- l. Anorectal malformation.
- m. Hirschsprung's disease.
- n. Malrotation and midgut volvulus.
- o. Omphalocele.
- p. Intussusception.
- q. Meckel's diverticulum.

15. Neurosurgery:

- a. Head trauma.
- b. Spinal cord trauma.
- c. CNS tumors.
- d. CNS bleeding.
- e. G.C.S.
- f. Skull fracture classification & management.
- g. Hydrocephalus.
- h. Brain infection (abscess).
- i. Cerebellar injury.
- j. Congenital malformation: spina bifida, spina occulta.

16. Thoracic surgery:

- a. Chest trauma:
- b. Chest wall trauma.
- c. Heart trauma.
- d. Lung trauma.
- e. Mediastinum:
- f. Anatomy
- g. Tumors.
- h. Abscess.
- i. Chest tumors:
- j. Chest wall tumors.
- k. Lung tumors.
- l. Esophageal tumors.
- m. Plural tumors.
- n. Superior vena cava syndrome.

Clinical cases:

- o. History taking and clinical examination.
- p. Clinical diagnosis of swellings and tumors.
- q. Common conditions like: cellulites, abscess, lipomas etc.
- r. Ulcers, sinuses, fistulas.
 - s. Lesions of the head, scalp, skull, face, lips, tongue, palate, cheek, jaw and floor of the mouth.

- t. Parotid swellings.
- u. Swellings at the side, in the midline, and in the submandibular triangle of the neck.
- v. Thyroid lesions including physiological, nodular, toxic, malignant, and other lesions.
- w. Axillary swellings.
- x. Clinical diagnosis of acute abdomen.
- y. Abdominal swellings including organomegaly and swellings in different quadrants.
- z. Abdominal pain and dyspepsia.
- aa. Dysphagia.
- bb. Hematemesis.
- cc. Jaundice of surgical importance.
- dd. Hepatomegaly.
- ee. Splenomegaly.
- ff. List History taking in anal and rectal diseases.
- gg. Clinical diagnosis of hernia cases: Inguinal, femoral and umbilical.
- hh. Scrotal and inguinoscrotal swellings.
- ii. Peripheral ischemia.
- jj. Gangrene.
- kk. Varicose veins.
- ll. Peripheral nerve injuries.
- mm. Edema of the limbs.
- nn. A swelling in the popliteal fossa.

Jars:

1. Intestines:

- Colon polyps.
- Carcinoma of the lower rectum.
- Carcinoma of the cecum.
- Acute appendicitis.
- Typhoid ulcer of the colon.

2. Hepatobiliary:

- Chronic calculous cholecystitis.
- Multiple liver metastases.
- Chronic calculous cholecystitis with a solitary cholesterol stone.

3. Spleen:

- Injured enlarged spleen.
- Splenomegaly

4. Breast:

Breast cancer.

5. Head & Neck:

- Solitary thyroid nodule.
- Multinodular goiter.
- Epithelioma of the scalp

List of Surgical Anatomy Topics:

- The scalp.
- The thyroid.
- The parotid gland.
- The breast.
- Axillary and brachial arteries.
- Radial, median and ulnar nerves.
- Abdominal wall.
- The inguinal canal.
- The stomach.
- The rectum and anal canal.
- The liver.
- The spleen.
- Femoral and popliteal arteries.
- Long and short saphenous veins.
- Sciatic, medial and lateral popliteal nerves.
- Muscles: sternomastoid, deltoid, pectoralis major, latissimus dorsi, rectus abdominis, quadriceps, psoas major.

List of operative procedures:

- Principles of coverage of a skin defect.
- Thyroidectomy.
- Principles of management of hyperthyroidism.
- Principles of management of carcinoma of the thyroid gland.
- Management of cold abscess of the neck.
- Hand infections.
- Management of a sucking wound of the chest.
- Management of hemothorax.
- Management of pneumothorax.
- Acute lactational mastitis and breast abscess.
- Principles of management of carcinoma of the breast.
- Hernia operations.
- Management of inguinal hernia (technique).
- Management of strangulated inguinal hernia.
- Appendectomy.
- Management of a stab wound in the right hypochondrium.
- Management of rupture spleen.
- Principles of management of adhesive intestinal obstruction.
- Management of bleeding esophageal varices.
- Management of bleeding peptic ulcer.
- Management of perforated duodenal ulcer.
- Management of infantile ileocecal intussusceptions.
- Principles of management of hemorrhoids.
- Management of acute anal fissure.
- Principles of management of arterial injuries.
- Above the below knee amputation.

Bedside skills:

- IV, IM and SC injections.
- Insertion of IV cannula.
- Insertion of tube.
- Simple skin suturing.

REFERENCES:

- An introduction to the Symptoms and Signs of Surgical Disease; Browse.
- Bailey and Love's Short Practice of Surgery, 23rd Edition.
- Current Surgical Diagnosis and Treatment, 11th Edition.

PEDIATRICS

Subject	Lectures (hours)	Practical (hours)	Tutorials (hours)	Clinical Teaching (hours)	Total
Pediatrics	60	120	93	375	648

CURRICULUM OF PEDIATRICS DEPARTMENT:

Pediatrics department of University of Tripoli for Medical Sciences (Tripoli) has three hospitals attached to it. First is Al-Gala Maternity and Children which has got 350 beds. Second is Pediatrics department of Al-Khadra hospital with 120 beds. Third is the pediatric department of Tripoli Medical Centre with 120 beds. The total number of beds of Pediatric department is 590 beds. All three departments are equipped with Labor rooms of modern facilities and high quality for resuscitation of newborn, antenatal clinic, postnatal (well baby clinic), and (premature unit). Al-gala hospital has got general pediatric beds divided into four general units and specialized Oncology unit, Intensive care unit, pre-mature unit, and dialysis unit.

Premature unit is well equipped with modern incubators, Phototherapy unit, and arrangement, for exchange transfusion. In Al-Khadra hospital, there are two units consisting of general pediatric ward and one neonatal intensive care unit each. The two neonatal intensive care units are one for the clean babies and other for infected babies. The pediatrics department of Tripoli Medical Centre consists of three units. Endocrinology unit, cardiovascular unit and neurology unit. In addition, there is also neonatal unit of high standards.

Objectives of Course:

The objectives of the course are:

- To support acquisition of basic knowledge of normal and abnormal growth and development (physical, physiologic, psychosocial), and its clinical application from birth through adolescence.
- To enable students to provide basic health care for individuals in the pediatric age group (neonates, infants, children and adolescents).
- To provide students with an appropriate background covering the common and important Pediatric emergencies and diseases.
- To enable the development and application of appropriate professional attitudes, communication and problem-solving skills

Professional and Practical Skills:

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

- Check vital signs in neonates, infants, children and adolescents.
- Assess physical and mental development in neonates, infants, children and adolescents according to standard milestones and recognize abnormalities.
- Perform appropriate clinical and anthropometries assessments for the nutritional status of infants and children.
- Recognize different neonatal and pediatric emergencies.
- Construct a proper history for a patient in the pediatric age group.
- Perform an adequate clinical examination for a patient in the pediatric age group and identify deviations from normal.
- Interpret patient's data in an organized and informative manner.

Learning Outcomes:

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

- Describe normal growth and development during infancy, childhood and adolescence.
- Describe appropriate management for abnormalities affecting growth and development.
- Demonstrate an understanding of the impact of congenital and inherited diseases on children and their families.
- Determine the nutritional requirements and the most common nutritional disorders affecting infants and children, and describe appropriate management for disorders.
- Describe the indications, contraindications, administration and precautions of the immunizations necessary for infants and children according to the national schedule and the condition of the child.
- Recognize the most important behavioral and social issues during childhood and adolescence.
- Describe appropriate measures for health promotion as well as prevention of disease and injury in infants, children and adolescents.
- Cite the management priorities for different neonatal and pediatric emergencies.
- Describe the causes and pathogenesis of the most important neonatal and pediatric problems.
- Describe the clinical symptoms and signs of the most important neonatal and pediatric problems.
- Identify the appropriate diagnostic tools (and describe how they would be interpreted) and therapeutic lines for the most important neonatal and pediatric problems.

Teaching & Learning Methods:

- Illustrated lectures: Large group plenary sessions in lecture theaters are time tabled, they set the scene for a topic, highlight important issues and arouse curiosity in relevant areas.
- Clinical rounds: Tutors demonstrate the core practical clinical skills and students practice these skills on patients under supervision for 3 hours daily.
- Problem based learning: To study written descriptions of clinical situations.
- Tutorial (small groups): For giving introduction, indications and interpretations of clinical laboratory tests, radiography and electrocardiography
- Practical clinical technique: Focus on the development of practical skills appropriate to the clinical situation.
- Assignment (mini lecture): Each student completes a review on a selected topic and delivered in a known dead time.
- Attendance with guidance (once weekly).

Student assessment methods:

- Mid-Term written exam to assess knowledge and intellectual skills.
- Final written exam to assess professional skills.
- Oral exam to assess knowledge and professional skills and attitude.
- Clinical cases examination.
- Log book.

Tutorial Discussion:

Tutorial is meant to discuss the clinical problem between the teacher and students to clarify any doubts and misconception of the students. It is necessarily a two-way traffic between students and teacher and it is not meant to be another theory lecture.

SYLLABUS:**I. Pediatrics Lectures:**

- **Introduction to Pediatrics.**
- **Nutrition and its disorders:**
 - o Normal nutritional requirement.
 - o Infant feeding.
 - o Protein caloric malnutrition.
 - o Rickets & vitamin deficiency.
- **Growth and development I & II.**
- **Respiratory system diseases:**
 - o Acute upper respiratory tract infections.
 - o Pneumonia and bronchiolitis.
 - o Bronchial asthma I & II.
 - o WHO program of acute respiratory infections (ARI).
 - o Foreign body aspiration and other problems of respiratory tract.
- **Cardiovascular system diseases:**
 - o General aspects of cardiac diagnosis & management of CHD.
 - o CVS assessment.
 - o A cyanotic CHD I & II.
 - o Cyanotic CHD I & II.
 - o Acquired heart diseases (Rheumatic fever & Infective endocarditis).
 - o Pediatric ECG & Cardiac Arrhythmias I & II.
 - o Cardiomyopathy & metabolic diseases affecting heart.
- **Urinary tract diseases:**
 - o Renal anomalies & renal function.
 - o Acute glomerulonephritis & ARF.
 - o Nephrotic syndrome.
 - o U.T.I.
 - o Chronic renal disorders.
 - o Pediatric Fluid & Electrolyte requirements & disturbances I & II.
 - o Wilm's tumor.
- **Rheumatology**
 - o The Child with Chronic Arthritis:
Definition of arthralgia, arthritis & chronic arthritis, types of juvenile idiopathic arthritis (JIA), clinical features of different sub- types of JIA, principles of investigation and treatment.
 - o Childhood Vasculitis:
Definition of vasculitis, types of vasculitis in children, clinical features of Henoch – Schoenlein purpura (HSP), criteria for diagnosis of HSP, management of HSP, criteria for diagnosis of Kawasaki disease (KD), treatment approach and recognize the complications of KD.
 - o The Child with Acute Limping:
Normal gait cycle, definition of limping, causes of acute limp, differentiate causes

based on clinical features (irritable hip & slipped Capital femoral epiphysis /septic arthritis), relevant investigations required, treatment of common causes of limping.

- **Nervous system diseases:**

- o Assessment of a child with neurological defects.
- o Developmental disorders of CNS.
- o Myopathies.
- o CSF circulation and hydrocephalus.
- o Space occupying lesions & raised intracranial tension.
- o Inflammatory disorders of CNS-meningitis.
- o Inflammatory disorders of CNS-Encephalitis.
- o Childhood tuberculosis.
- o Cerebral palsy & upper motor neuron diseases.
- o Hydrocephalus.
- o Acute flaccid paralysis & other lower motor neuron diseases.
- o Seizures I & II.

- **Hematology & Oncology:**

- o Anemia I & II.
- o Bleeding disorders I & II.
- o Leukemia & Lymphoma.
- o Solid Tumors.

- **Newborn diseases:**

- o Value and dangerous of incubators.
- o Assessment of the newborn.
- o Breast feeding.
- o Artificial feeding.
- o Tracheoesophageal anomalies.
- o Maternal factors causing fetal dysmorphism.
- o Normal newborn.
- o Small for date and prematurity.
- o Neonatal infections.
- o Respiratory distress in newborn.
- o Neonatal jaundice.
- o Birth injury and hemorrhagic diseases of newborn.
- o Neonatal convulsions.
- o Neonatal hypoglycemia & Infant of diabetic mother.
- o Umbilical sepsis.

- **Infectious diseases:**

- o Bacterial infection I & II.
- o Viral infection I & II.
- o Childhood T.B.
- o HIV infections.
- o Parasitic infections.

- **Endocrine system diseases:**

- o Diabetes mellitus & management of diabetic coma.

- o Pituitary gland disorders.
- o Thyroid gland disorders.
- o Adrenal gland disorders.
- o Ambiguous genitalia.
- o Bone marrow failure.
- o Neuroblastoma.
- **GIT disorders:**
 - o Vomiting in first year of life.
 - o Management of acute gastroenteritis.
 - o Parasitic infection & infestation in Libyan children.
 - o Constipation.
 - o Abdominal pain.
 - o Abdominal distension.
 - o Acute diarrhea and dehydration. Chronic diarrhea & malabsorption.
 - o Hepatic function tests & infective hepatitis.
 - o Congenital absence of bile duct cirrhosis and portal hypertension.
 - o Acute liver diseases.
 - o Chronic liver disease & cirrhosis.
- **Immunity & C.T. diseases:**
 - o Principles of immunology.
 - o Immune deficiency disorders.
 - o Juvenile chronic arthritis & SLE.
- **Genetics and chromosomal disorders:**
 - o Mode of inheritance & risk of recurrences.
 - o Chromosomal diseases.
- **Pediatric Toxicology:**
 - o Childhood poisoning, I & II.
- **Metabolism diseases:**
 - o Inborn errors of metabolism.
- **Psychiatric diseases:**
 - o Child abuse.
 - o Attention deficit.
 - o Hyperactivity disorders.
 - o Autism.
 - o School phobia.
- **Immunizations & cold chain:**
 - o General Lectures.
 - o Cyanosis.
 - o A large head.
 - o A small head.
 - o Vomiting in first 6 months of life.
 - o Short stature.
 - o Obesity.
 - o Limping gait.

- o Pyrexia of unknown origin.
- o Polyuria in childhood.
- o Down's syndrome.
- o Eczema.
- o Excessive sweating.
- o School phobia.
- o Inability to walk.
- o Breath holding attack.
- o Enuresis.
- o Thumb sucking.
- o Vitamin supplements.
- o Misuse of antibiotics.
- o Neonatal tetany.
- o Maculopapular rash.

II. Pediatric Tutorials:

- Hepatosplenomegaly.
- Cretinism.
- Megacolon.
- Hydrocephalus.
- Examination of newborn: care, Neonatal reflexes.
- Examination of child: measurement formula for height & weight.
- Cyanosis.
- Clubbing of nails.
- Pallor.
- Jaundice.
- Pitting oedema.
- Ascites.
- Umbilical hernia & other congenital anomalies.
- Rickets.
- Respiratory system.
- Cardiovascular system.
- Central nervous system.
- Abdominal examination.
- Formula feeding.
- Scurvy.
- Immunization.
- Cerebral palsy.
- Hemiplegia, Blindness, Papilledema.
- Facial palsy.
- Mental retardation.
- Kerosine poisoning.
- V.S.D., P.D.A., Fallot's tetralogy, Rheumatic fever.
- Poliomyelitis.
- Maculopapular rash.
- Painful joint.
- Otitis media.
- Burns.

- Ascariasis.
- Pain in abdomen.
- Foreign in larynx, trachea and bronchi.
- Emergency in new born infancy and childhood.
- Management: Asthmatic bronchitis, acute bronchiolitis, nephritic syndrome, pyogenic.
- meningitis, tuberculous meningitis, febrile convulsion, chronic cough.
- Breast feeding.
- Stridor & foreign body in children.
- Recurrent wheezy chest.
- Cardio-pulmonary resuscitation.
- Cough & Cyanosis in children.
- Hypertension in children.
- Heart failure in children.
- Hematuria & proteinuria.
- Recurrent UTI & vesico-ureteral reflex.
- Diabetic ketoacidosis (DKA).
- Failure to thrive.
- Short stature.
- Hepatosplenomegaly.
- Unconscious child.
- Lymphadenopathy in children.
- Small & large Head.
- Floppy infant.
- Arthritis & limping in children.
- Vomiting in infancy.
- Febrile convulsions.
- Childhood ataxia.
- Precocious & delayed puberty.
- Acute & recurrent abdominal pain in children.
- Constipation in children.
- Neurocutaneous diseases & mental retardation.
- Immunization & cold chain.
- Management of dehydration & ORS.
- Nocturnal enuresis.
- Child psychiatry.

Pediatric Emergency

- Newborn resuscitation.
- Management of shock.
- Anaphylaxis.
- The young person with poisoning.
- Scenario management of Acute Asthma.
- Scenario management of status epilepticus.
- Foreign body aspiration.

REFERENCES:

- Nelson's Essentials of Pediatrics.

FOURTH STAGE

INTERNSHIP YEAR

After successfully passing all the courses, the student will begin the training course (internship). The bachelor's degree in medicine and surgery is only awarded after completion of the training period as stated below.

Objective Of Internship Training Program:

It is an opportunity to apply, and expand clinical knowledge and skills, and gradually increase responsibility to providing safe, high-quality patient care meets the community needs; to develop research skills and to develop new capabilities and career planning.

Intended Learning Outcomes:

A. Knowledge And Understanding

1. Describe the pathophysiology of common health problems.
2. Outline the causes of common medical problems.
3. Recognize the presentation of common medical emergencies.
4. Identify the principles of disease prevention and health promotion and infection control at the health facility.
5. Identify important medications and list the side effect of frequently used drugs.

B. Intellectual Skills

1. Exhibit critical thinking and problem-solving skills by analyzing underlying conditions faced at real practical life.
2. Provide patient-centered care through the integration of medical knowledge, clinical competency, and professionalism.
3. Discuss issues related to environmental health, occupational health and nutritional health.
4. Discuss appropriate diagnostic and therapeutic management strategies for common diseases.
5. Acquire the ability to conduct a research-based on ethical and scientific evidence.

C. Practical And Professional Skills

1. Demonstrate the ability to take a history, perform physical examination and diagnosis and manage common clinical problems.
2. Manage the common types of emergencies (medical, surgical, obstetric, and pediatrics)
3. Demonstrate the ability to screen patients for common diseases in the community and apply the concepts of risk assessment and risk management.
4. Order and interpret the results of the main tests relating to investigations based on the presentation of common medical problems.
5. Discuss the management plan for common medical conditions.
6. Perform basic procedures and prescribe, and to monitor drugs and fluids under supervision.
7. Demonstrate the ability to document, register health information of the patients, writing prescription and notify the common health problem; and make appropriate referrals.

D. General And Transferable Skills

1. Communicate clearly, sensitively and effectively with patients, their families, doctors, and other health professionals.
2. Apply health education at a level of individual and community.
3. Respect the patient's rights, dignity, privacy, information confidentiality, and autonomy.
4. Manage time effectively.
5. Leadership and working cooperatively and effectively with others.
6. Apply life- long learning and continuous development.

Assessment Methods

During Internship emphasis will be laid on practical “hands-on” experience and building deep knowledge and practical skill on history taking, clinical examination and interpret lab result. The concerned departments will be encouraged to develop a diary / log book which gives details of tasks / cases to be seen by the interns under supervision of senior

**Head of Graduate Department, Registrar Office
University of Tripoli
Tripoli, Libya**

**Office of the Dean
Faculty of Medicine**