



Lab **Physiology**

BIOCHEMISTRY

WOMEN MEDICAL COLLEGE

A b b o t t a b a d



Created by:
Dept. Medical Education & Research (DME&R)

Lab Manual

Physiology Lab



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Description:

The skills lab of Women Medical College was constructed in 2019; the purpose of the skills laboratory was to support the acquisition of clinical skills through hands-on training within a non-threatening environment.

Learners commonly practice the procedural skills' psychomotor component under the trainers' instruction, who have previously demonstrated the relevant skill. Subsequently, the skills are then performed by the learners themselves under supervision.

Aims and Objectives:

The core aim of the skills lab is to

1. Help undergraduate students and health professionals learn the correct steps and sequence for performing a skill.
2. It also helps to measure students' progress in learning as they gain confidence in the skill.
3. Ensure patient safety.
4. Using high-fidelity simulation devices such as partial-task trainers or full-body mannequins to practice and acquire psychomotor skills.

The mission of the laboratory is to promote clinical competence, ensure patient safety and enhance the skills of medical students (both undergraduate and postgraduate) during their training.

Faculty Responsible for Course Conduction:

Sr. No	Faculty	Department	Designation
1.	Dr Shazia Ayub	Physiology	Senior lecturer
2.	Dr Sahar Jaffri	Physiology	Senior lecturer
3.	Dr Nadia Qamar	Physiology	Senior lecturer
4.	Dr Shaheen Khattak	Physiology	Senior lecturer
5.	Dr Botaina Qayum	Physiology	Senior lecturer
6.	Dr Shahbano Shabir	Physiology	Demonstrator
7.	Mr. Shuja	Physiology	Lab technician
8.	Shahabia bano	Physiology	Lab assistant

Equipment of Practical Lab

Model 1:

Model name: Microscope

A light microscope is a tool that can identify, observe and magnify objects by transmitting light through a string of lenses. It is one of the most used tools in the field of biology. Microscopes are rightly used in medicine, microbiology.

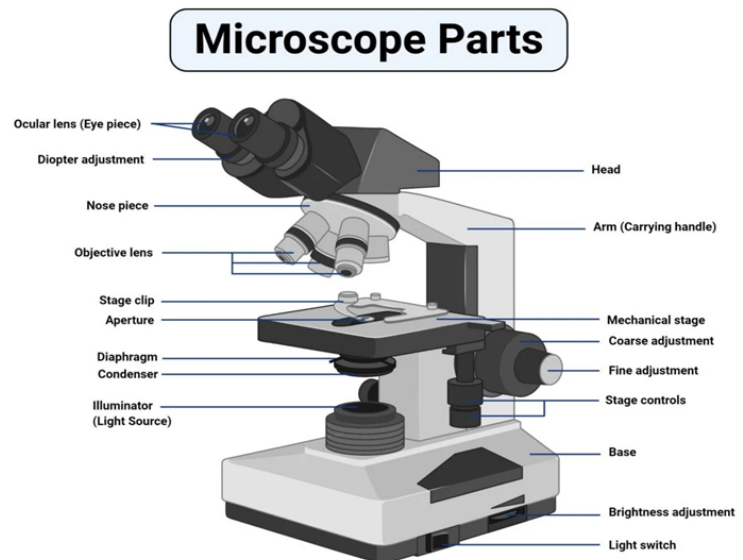


Figure: Parts of a microscope, Image Copyright © Sagar Aryal, www.microbenotes.com

Model 2:

Model name: Sahli's Hemoglobinometer

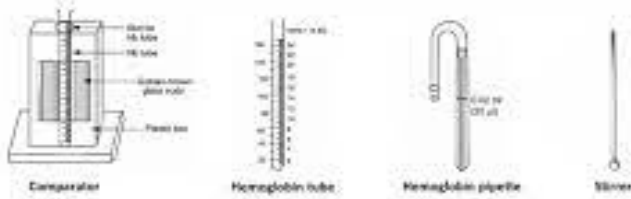
Sahli's method also called the acid hematin method, is the visual comparator method for the estimation of hemoglobin. As visual comparison may lead to unacceptable imprecision and accuracy, this method is not recommended nowadays, and the use of spectrophotometric methods like the Cyanmethemoglobin method is preferred it.

Principle:

When the blood is added to dilute hydrochloric acid (HCl), hemoglobin present in the RBCs is converted into brown-colored acid hematin. The acid hematin solution is further diluted until its color matches exactly with the permanent standard brown glass compared by direct vision.



Sahli's Hemoglobinometer Set



Model 3:

Model name: Sphygmomanometer

Description:

An instrument for measuring blood pressure, typically consisting of an inflatable rubber cuff that is applied to the arm and connected to a column of mercury next to a graduated scale, enabling the determination of systolic and diastolic blood pressure by increasing and gradually releasing the pressure in the cuff.



Model 4

ECG Machine

The standard ECG machine consists of

1. Output device
2. Electrodes; 6 unipolar chest leads and 3 bipolar limb leads
3. Connecting wires



Model 5

Peak Expiratory Flowmeter

Peak expiratory flowmeter is used to measure degree of airway obstruction

It consists of

- Numbered scale
- Mouthpiece



Model 6

Westergren's Tube

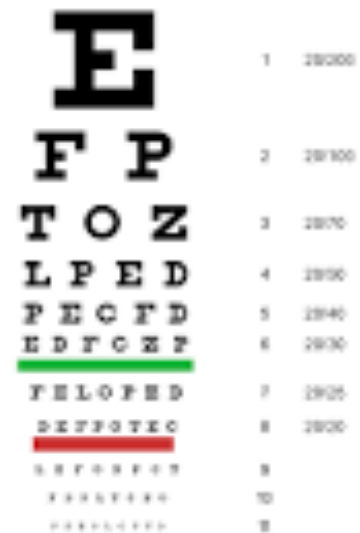
The Westergren method measures the distance (in millimeters) at which red blood cells in anticoagulated whole blood fall to the bottom of a standardized, upright, elongated tube over one hour due to the influence of gravity. The tube used for the test is called the Westergren tube.



MODEL 7

Snellen's Chart

A Snellen chart is an eye chart that can be used to measure visual acuity.



Model 8

Ophthalmoscope

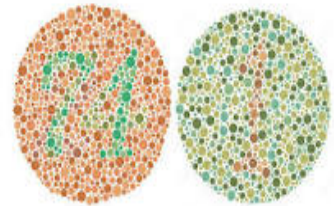
An ophthalmoscope is about the size of a flashlight. It has a light and different small lenses that allow the provider to view the back of the eyeball. Indirect ophthalmoscopy. You will either lie or sit in a semi-reclined position.



Model 9

Ishihara Chart

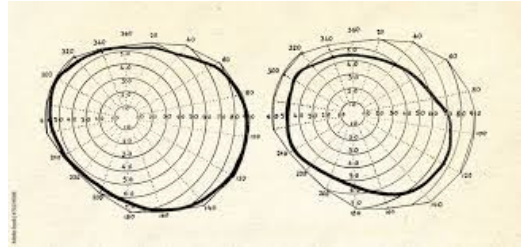
This color vision test, known as the Ishihara Test, makes numbers out of dots that are a different color than the dots surrounding them.



MODEL 10

PERIMETRY

Perimetry refers to the systematic measurement of the visual field, and is an essential component of defining the extent and progression of glaucoma, as well as numerous other eye conditions.



Curriculum for Undergraduate students:

S.No	Class	Topic	Learning Outcomes	Teaching Hours	Mode of Teaching	Assessment Tools
1	1st Year MBBS	Microscope	<ul style="list-style-type: none"> Identify parts of microscope. Demonstrate operation of microscope. Describe the method of focusing slide at different magnifications. Follow the specified norms of lab work. 	2	Demonstration and practical	OSPE Viva
2			<ul style="list-style-type: none"> Hemoglobin determination Assist in phlebotomy while practicing aseptic procedure. Determine the hemoglobin (Hb) concentration in the given sample Estimation of hemoglobin by Sahli's method Determination of packed cell volume 	2	Demonstration	OSPE Viva
3		Blood cells	<ul style="list-style-type: none"> Identify and describe various blood cells under microscope. 	2 hrs.	Demonstration	OSPE VIVA

4		RBC Count	<ul style="list-style-type: none"> Determine the red blood cell (RBC) count in the given sample and calculate RBC indices 	2 hrs.	Demonstration	OSPE Viva
5		TLC Count	<ul style="list-style-type: none"> Determine the total leukocyte count (TLC) in the given sample 	2 hrs.	Demonstration followed by discussion	OSPE Viva
6		DLC	<ul style="list-style-type: none"> Determine the differential leukocyte count (DLC) in the given sample 	2 hrs.	Demonstration followed by discussion	OSPE Viva

7		Clotting time	<ul style="list-style-type: none"> Determine the clotting time 	2 hrs.	Demonstration	OSPE Viva
8		Bleeding Time	<ul style="list-style-type: none"> Determine the bleeding time 	2 hrs.	Demonstration followed by discussion	OSPE/ VIVA
8		Hematocrit Determination	<ul style="list-style-type: none"> Determine the hematocrit in the given sample 	2 hrs.	Demonstration followed by practical	OSPE Viva
9		Blood grouping	<ul style="list-style-type: none"> Determine the O-A-B and Rh blood group in the given sample 	2 hrs.	Demonstration followed by practical	OSPE

10		Blood smear preparation	<ul style="list-style-type: none"> • Prepare blood smear by thumb prick method. 	2 hrs.	Demonstration followed by practical	OSPE VIVA
11		ESR	<ul style="list-style-type: none"> • Determination of ESR in a given blood sample 	2 hrs.	Demonstration followed by practical	OSPE Viva
12		Blood pressure	<ul style="list-style-type: none"> • Measurement of blood pressure 	2 hrs.	Demonstration followed by practical	OSPE VIVA and
13		Arterial pulses	<ul style="list-style-type: none"> • Examination of the arterial pulses e.g. Radial, Brachial, Carotid, Femoral and popliteal 	2 hrs.	Demonstration followed by practical	OSPE and Viva
14		Apex beat	<ul style="list-style-type: none"> • Examination and location of apex beat 	2 hrs.	Demonstration followed by practical	OSPE and Viva
15		Heart sounds	<ul style="list-style-type: none"> • Auscultate areas of the heart sounds. First heart sound 2nd heart sound 	2 hrs.	Demonstration followed by practical	OSPE and Viva
16		JVP	<ul style="list-style-type: none"> • Measurement of Jugular Venous Pulse 	2 hrs.	Demonstration followed by practical	OSPE VIVA and

17		ECG	<ul style="list-style-type: none"> Interpretation and recording of ECG 	2 hrs.	Demonstration followed by practical	OSPE and Viva
18		PEFR	<ul style="list-style-type: none"> Measurement of Peak expiratory flow rate 	2 hrs.	Demonstration followed by practical	OSPE and Viva
S.no	Class	Topic	Learning outcomes	Teaching Hours	Mode of Teaching	Assessment Tools
1	2 nd year	Examination of olfactory nerve	Examine a standardized patient for cranial nerve I, examination of sense of smell	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
2	2nd year	Examination of Cranial Nerves III, IV and VI	Examine a standardized patient for extraocular muscles movement.[oculomotor, Abducens and Trochlear nerves]	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
3	2nd year	Examination of trigeminal cranial nerve [v]	Examine a standardized patient for cranial nerve v Trigeminal N,	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva

4	2nd year	Examination of facial nerve [vii]	Examine a standardized patient for cranial nerve vii for taste[ant 2/3rd and symmetry of face	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
5	2nd year	Examination of vestibular cochlear nerve[viii]	Examine a standardized patient cranial nerve [viii] for air and bone conduction by using tuning fork	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
6	2nd year	Examination of glossopharyngeal nerve[ix]	Examine a standard patient for position of uvula, Gag and swallowing reflex	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
7	2nd year	Examination of Vagus nerve[X]	Examine a standardized patient for Cranial nerves X	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
8	2nd year	Examination of Accessory Cranial nerves [XI]	• Examine a standardized patient for strength and paralysis of sternocleidomastoids and trapezius Cranial nerves XI,	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva

8	2nd year	Examination of hypoglossal nerve[xii]	Examine a standardized patient for position and movement of tongue.	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
9	2nd year	Visual Acuity	Examine a standardized patient for visual acuity and errors of refraction	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
10	2nd year	Perimetry	Examine a standardized patient for visual field function	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
11	2nd year	Tuning fork test	Examine a standardized patient for hearing loss with tuning fork (Weber and Rinne`s and schawabach tests)	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
12	2nd year	Fundoscopy	Examine a standardized patient fundus in dark room	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
13	2nd year	Examination of superficial reflexes	Examine a standardized patient for superficial reflexes	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
14	2nd year	Examination of deep tendon reflexes-1	Examine a standardized patient for deep tendon reflexes of lower limbs	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva

15	2nd year	Examination of deep tendon reflexes-2	Examine a standardized patient for deep tendon reflexes of upper limbs	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
16	2nd year	Pregnancy Test	Understand the basis of pregnancy test Perform the pregnancy test by using pregnancy test kit and urine sample provided in the laboratory.	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva
17	2 nd year	Recording of body temperature	Recording of temperature by using Celsius and Fahrenheit scale thermometer	2 hours	Demonstration followed by practical performance and discussion	OSPE and Viva

Standard Operating Procedures (SOPs):

The following guidelines for the smooth running of Skills and Practicals are presented and the users are expected to follow these.

- Students are strictly prohibited to write anything on the apparatus, tables, walls etc.
- After using them in the skills lab, needles and blades should be disposed of in the closest sharps container rather than being reused.
- Doors should be firmly closed and locked while leaving the lab area, and lights should be turned off.
- Students are not to be left unattended by faculty or staff at any time.
- In case any faculty members or students get hurt, a first aid kit will always be on hand in the skills lab.
- No food and drinks will be allowed in practical lab.
- Unauthorized persons are not allowed in the labs at any time.