

**Department of Biology**

**Course book of: Animal Physiology**

**Year:2021**

**Lecturer’s name:**

**Academic year: 2020-2021**

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# Course book outline

|  |  |
| --- | --- |
| **1. Course name** | **Animal Physiology** |
| **2. Lecturer in charge** |  |
| **3. Department/ College** | **Biology/College of Education** |
| **4. Contact** | **e-mail:**  **Tel:** |
| **5. Time (in hours) per week** | **Theory: 2**  **Practical: 3** |
| **6. Office hours** | **Availability of the lecturer during the week** |
| **7. Course code** |  |
| **8. Teacher's academic profile** | **e.g Webpage, Blog, Moodle…**  **or few paragraphs about not less than 100 words** |
| **9. Keywords** |  |
| **Course book designers** |  |
| **Contact** |  |

# Course overview

Animal physiology is a branch of biology that studies how the animal body works, and investigates the biological processes that occur for animal life to exist. It has been a mandatory course for biology students in their third-year at the Department of Biology, College of Education / University of Garmian since its foundation, and has been theoretical and practical. The course is to give comprehensive coverage to systems’ physiology, concentrating on mammals, particularly in humans. The course builds from knowledge of function at the cellular level to the complex operation of major body systems at the level of the whole organism. Most of the course is devoted to the study of all the major body systems. The remaining takes an integrated approach to examine how these systems respond to various challenges from the everyday to the extreme. The course also includes some exciting experimental practicals. Experimental practical work is largely designed to allow students to study their own physiology. Examples include Blood volume, Blood Pressures, Body Mass Index, and Bleeding Time and Clotting Time, and also some histology classes designed to help you appreciate relationships between structure and function.

# Course objective:

1. To provide students with a basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body, and how physiological systems work solely and in connection with each other.

2. To develop the ability to think critically about issues in animal physiology and write about those in an effective manner and to provide the opportunity to learn basic laboratory skills applicable to all laboratory work in biology.

3. To learn to properly and safely use animal models and modern laboratory equipment to conduct research and projects.

**Workload and Grading**

**Workloads**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Student workload/week | Hours | Student workload/Semester | Hours |  |
| Theoretical lecture | 2 | Total workload hours/14 weeks | 105 |  |
| Preparations for Lecture | 1.5 | Project | 24 |
| Practical lecture | 3 | Assignments | 8 |
| Review and quizzes | 1 | Award | 0 |
| ? |  | Preparations for Midterm exam | 8 |
| ? |  | Preparations for final exam | 10 |
| Presence | 0 | Seminar | 7 |
| Group activity | 0 | other activities |  |
| ? |  | ? | 0 |
| Total hours/week | 7.5 | Total workload hours/Semester | 162 |  |
| Total hours/14 weeks | 105 | Credit | 6 | **ECTS** |

**Grading**

|  |  |
| --- | --- |
| **Workload** | **Grading/100** |
| Theoretical lecture | **10** |
| Lecture preparations | **0** |
| Practical lecture | **15** |
| Review and quizzes | **10** |
| Seminar | **5** |
| Assignments | **5** |
| Presence | **0** |
| ? | **0** |
| other activities | **0** |
| Project | **15** |
| Workshop | **0** |
| Award | **0** |
| Preparations for Midterm exam | **0** |
| Final exam | **40** |
| ? | **0** |
| ? | **0** |
| ? | **0** |
| **Semester Grades** | **60** |
| **Final Exam** | **40** |
| **Overall Grades** | **100** |

# Student learning outcome:

1. Students will be able to describe and explain basic understanding of the fundamental processes and mechanisms that serve and control the various functions of the body, and how physiological systems work solely and in connection with each other.
2. Students will be able to think critically about issues in animal physiology and write about those in an effective manner and to provide the opportunity to learn basic laboratory skills applicable to all laboratory work in biology.
3. Students will be able to use animals and modern laboratory equipment to conduct research properly and safely.

# 

# Student’s obligation

• **Theory**: attendance will not take in lecture. Attending lectures and taking good notes will increase your ability to do well in class. Lectures will be accompanied by PowerPoint slides. In addition, lectures will sometimes include unannounced group activities that will earn points for all students in attendance. If you miss one of these group activities for any reason, you will not be able to make it up. These PowerPoint presentations will be missing vital information that you will want to fill in as we go along. In addition, I may discuss topics not addressed in the PowerPoint slides. If you miss a lecture, it is in your best interest to get notes from a classmate. Anything that is discussed in class may be covered on an exam whether it is presented on the lecture slides or not!

Note:

• If you are horribly sick or will miss a lecture for any reason, please contact me (teacher) prior to the beginning of the lecture to be considered for an excused absence and not lose points for a group activity.

• Cheating is not allowed and causes you to get zero in the exam.

• **LAB**: You should plan on lab taking the full 3 hours each week. Lab exercises have been designed to supplement and reinforce concepts taught in lecture. You are expected to attend every laboratory session and stay until your group’s tasks are completed. Attendance will be taken. An unexcused absence from the lab will lead to a “0” on that week’s lab quiz with no chance to make it up.

• Cheating is not allowed and causes you to get zero in the exam.

# Learning Methods

They have to be aligned with learning outcomes

For example

1. Problem-based learning

2. Work-based learning

3. Flipped classroom

4. Think-Pair-Share

5. Gallery Walk

6- Blended Learning (TCA and SCA)

# Assessment of scheme

**Assessment for learning**

**Main types of assessment**

* + - 1. Summative assessment: e.g. Oral or Paper exam (Multiple choice questions (MCQ), True false, explanation, discussion, cross match, filling blanks, …etc )
      2. Formative assessments ex:, daily assessment for group activity, quizzes, reports and assignments (other activity).
      3. Norm-referenced assessments

**Rubrics are required**

1. Rubric for Project

2. Rubric for seminar and presentation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Criteria | Rubric for seminar and presentation | | | |
| Excellent (4) | Good (3) | Satisfactory (2) | Poor (1) |
| Visual Appeal | Information is clear and concise on each slide.Visually appealing/engaging. | Too much information on two or more slides.Significant visual appeal. | Too much information was contained on many slides.Minimal effort made to make slides appealing or too much going on. | The slides were difficult to read and too much information had been copied onto them.No visual appeal. |
| Comprehension | Extensive knowledge of the topic. Accurately answered all questions posed. | Most showed a good understanding of the topic.Able to answer most of the audience questions. | Few members showed a good understanding of some parts of the topic.Only some members accurately answered questions. | Presenters didn’t understand the topic.Majority of questions answered by only one member or majority of information incorrect. |
| PresentationSkills | Regular/constant eye contact, The audience was engaged, and presenters held the audience’s attention.Appropriate speaking volume & body language. | Spoke to the majority of the audience; steady eye contact.The audience was engaged by the presentation.Majority of presenters spoke at a suitable volume. | Focused on only part of the audience. Sporadic eye contact by more than one presenter. The audience was distracted.Speakers could be heard by only half of the audience.Body language was distracting. | Focusing on a small part of the audience. Minimal eye contact, the audience was not engaged.Majority of presenters spoke too quickly or quietly making it difficult to understand.Inappropriate/disinterested body language. |
| Content | The presentation was a concise summary of the topic with all questions answered. Comprehensive and complete coverage of information. | The presentation was a good summary of the topic.Most important information covered; little irrelevant information. | The presentation was informative but several elements went unanswered.Much of the information is irrelevant; coverage of some of the major points. | The presentation was a brief look at the topic but many questions were left unanswered.Majority of information is irrelevant and significant points are left out. |
| Preparedness/Participation/Group Dynamics | All presenters knew the information, participated equally, and helped each other as needed.Extremely prepared and rehearsed. | Slight domination of one presenter. Members helped each other.Very well prepared. | Significant control by some members with one minimally contributing.Primarily prepared but with some dependence on just reading off slides. | Unbalanced presentation or tension resulting from over-helping. Multiple group members not participating.Evident lack of preparation/rehearsal. Dependence on slides. |

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# Rubric for Project

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Level**  **Criteria** | **Excellent**  **Score 4** | **Very Good**  **3** | **Good**  **2** | **Needs improvement**  **1** |
| **Aim** | **Achieves a clear and distinct aim and effective techniques of the main idea** | **Identifiable aim with a good main idea** | **Unclear aim or main idea** | **Unclear aim and main idea** |
| **Creativity** | **Clearly explored and expressed multiple ideas in a unique way.** | **The project is explored and expressed in a fairly original way.** | **The project is original, but mostly based off of an existing idea.** | **Follows a set of directions to complete a project, but did not explore new ways to alter the idea.** |
| **Organization** | **Clear organization: introduction, body and conclusion that fit the aim** | **Undeveloped introduction, body or conclusion. Organization is not fully clear** | **Unclear organization, along with undeveloped introduction, body, conclusion** | **Unclear organization. Introduction, body and conclusion are missed** |
| **Teamwork** | **Each one of group members contributed in the project** | **Most group members contributed in the project** | **Some group members contributed in the project** | **Few group members contributed in the project** |
| **Understanding the problem and requirements** | **Students recognize potential problems and look for clarifications.** | **Students’ work shows good understanding of the problem and requirements.** | **Students’ work shows understanding of the problem and most requirements.** | **Students’ work shows a slight understanding of problems and requirements.** |
| **Presentation** | **Information is presented with good knowledge and creativity.** | **Information is presented with acceptable knowledge and creativity.** | **Information is presented with limited knowledge and minimal creativity.** | **Information is unclear and presented with little creativity.** |

# 

# Course reading list and references

**Key references:**

Write a list of books, chapters, articles and useful websites that students can benefit from.

1. Ganong’s Review of Medical Physiology - 23rd Ed

2. Lippincott 2015 Illustrated Reviews, Pharmacology - Whalen, Karen

3. Laboratory\_Atlas\_of\_Anatomy\_and\_Physiology5

4. Atlas of clinical hematology

5. A Laboratory Guide to Human Physiology\_2002 pr

## Useful references:

### Magazine and reviews: Google

# The topics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No. | **Title of the subject** | | | weeks | Tutor’s name |
| Chapters | Theoretical | Practical | First week |  |
| 1- | Chapter One:  Overview about Animal Physiology | Introduction to Homeostasis and the basic of human body systems | Introducing Animal physiology Laboratory |
| 2- | Chapter two:  Cell membrane and Vesicular Transport | composition of Cell membrane and types of transportof substances through cell membrane | osmosis | Second week |  |
| 3- | Chapter three:  Human Circulatory and Respiratory system | 1- Heart and Blood Vessels  2- Blood Component  3- Respiratory system component and function, and Lung volumes and capacities | 1- ABO Groups, Bleeding time and Clotting Time test  2-RBC count  3- WBC Count  4- Haemoglobin  5- Spirometry Tests (in hospital) | 5 weeks (from third to eighth) |  |
| 4- | Chapter four:  Human Digestive and Excretory system | 1- Components of the digestive system and Mechanism of Food Digestion and Absorption  2- Constituents of the Excretory system and Mechanism of Exertion | 1- Body Mass Index (BMI)  2- Blood sugar test  3-General Urine Examination (physical)  4- Chemical Urine Examination | 4 weeks (from ninth to twelfth) |  |
| 5- | Chapter Five  Endocrine System | Components of the Endocrine system | Thyroid Stimulating Hormone (TSH) | thirteenth week |  |
| 6- | Chapter six  Lymphatic system | Lymphatic system components and function | Immunoglobulins G, and M (IgG, IgM) | fourteenth week |  |

# Chapter number: One (Overview of Animal Physiology)

## Lecturer/tutor’s name:

## Date:

## 2 hours: theoretical,

**Chapter one**

## Topics

The first chapter includes an Overview about Animal Physiology

In which introduces Homeostasis and the basics of human body systems. Physiological homeostasis is the tendency of the body to maintain critical physiological parameters (e.g., blood glucose level, blood salinity, blood pressure, core body temperature) of its internal environment within specific ranges of values. and introducing major human systems which includes Circulatory, Digestive, Excretory,Immune and lymphatic system,Nervous and Muscular Nervous **s**ystem.

## Practical topic: Introducing Animal physiology Laboratory

## Lecturer/tutor’s name:

## Date:

## 3 hours

During laboratory work the student must have information about thses tools and machines worked on throughout the course, because in the first practical lesson must introduce to the students basic laboratory equipment, how to work in the laboratory, and how to work safely (including fire hazards, safe handling of chemicals).

# Chapter number: Two (Cell membrane and Vesicular Transport)

## Lecturer/tutor’s name:

## Date:

## 2 hours: theoretical,

**Topic: Cell membrane**

In this chapter cell membrane and its compositions are discussed, cell membrane is a multifaceted membrane that envelops a cell's cytoplasm. It protects the integrity of the cell along with supporting the cell and helping to maintain the cell's shape. Proteins and lipids are the major components of the cell membrane.

## Practical topic: Osmosis

## Lecturer/tutor’s name:

## Date:

## 3 hours

The movement of water and small molecules across the selectively permeable membranes of mammalian cells is a fundamental concept of physiology. These processes can be difficult for students to visualize and appreciate, and it is often left to images in textbooks or online animations to explain such movements. By placing red blood cells in solutions of differing osmolarities and tonicities, this experiment demonstrates the effects of osmosis and the resultant changes in cell volume. Using hemoglobin standard solutions, where known concentrations of hemoglobin are produced, the proportion of hemolysis and the effect of this on resultant hematocrit can be estimated. This practice uses animal blood bathed in solutions with different osmolarities and tonicities to explore the concept of water movement by osmosis and the resultant hemolysis that can occur when red blood cells are exposed to hypotonic solutions.

# Chapter number: Three (Human Circulatory and Respiratory System)

# ELecturer/tutor’s name:

## Date:

## 2 hours: theoretical

## 1- Heart and Blood Vessels

The circulatory system, also called the cardiovascular system or the vascular system, is an [organ system](https://en.wikipedia.org/wiki/Biological_system) that permits [blood](https://en.wikipedia.org/wiki/Blood) to circulate and transport [nutrients](https://en.wikipedia.org/wiki/Nutrient) (such as [amino acids](https://en.wikipedia.org/wiki/Amino_acids) and [electrolytes](https://en.wikipedia.org/wiki/Electrolytes)), [oxygen](https://en.wikipedia.org/wiki/Oxygen), [carbon dioxide](https://en.wikipedia.org/wiki/Carbon_dioxide), [hormones](https://en.wikipedia.org/wiki/Hormone), and [blood cells](https://en.wikipedia.org/wiki/Blood_cell) to and from the [cells](https://en.wikipedia.org/wiki/Cell_(biology)) in the body to provide nourishment and help in [fighting diseases](https://en.wikipedia.org/wiki/Immune_system), [stabilize temperature](https://en.wikipedia.org/wiki/Thermoregulation) and [pH](https://en.wikipedia.org/wiki/PH), and maintain [homeostasis](https://en.wikipedia.org/wiki/Homeostasis).The essential components of the human cardiovascular system are the heart, blood and blood vessels. The heart pumps blood through blood vessels, which carry the blood to and from all areas of the body. This whole network of vessels for blood circulation is called the vascular system. All the arteries and veins outside the heart and head make up the peripheral vascular system.

## Practical topics: ABO blood groups, and Measurement of Bleeding time and Clotting Time test

## Lecturer/tutor’s name:

## Date:

## 3 hours

ABO Blood Groups is the classification of human [blood](https://www.britannica.com/science/blood-biochemistry) based on the inherited properties of red blood cells as determined by the presence or absence of the [antigens](https://www.britannica.com/science/antigen) A and B, which are carried on the surface of the red cells. Persons may thus have [type A](https://www.britannica.com/science/type-A-blood), [type B](https://www.britannica.com/science/type-B-blood), [type O](https://www.britannica.com/science/type-O-blood), or [type AB](https://www.britannica.com/science/type-AB-blood) blood. Bleeding Time (Bt)refers to the time taken for the termination of bleeding from capillaries. The bleeding from capillaries is arrested by platelet plug and contraction of the precapillary sphincters. Clotting time this is the time taken for the blood to clot by formation of fibrin threads. This can be measured for the capillary blood by the capillary tube method. Capillary Blood Clotting Time: Normal Clotting Time = 3 – 6 minutes. Normal clotting time = 2–4 minutes.

## Lecturer/tutor’s name:

## Date:

## 4 hours: Theoretical

**Topic: Blood Components**

Haematopoiesis is the formation of blood cellular components (RBC,WBC, Platelets) with Blood Plasma, all cellular blood components are derived from haematopoietic stem cells. It occurs within the hematopoietic system, which includes organs and tissues such as the bone marrow, liver, and spleen ( i.e Blood is a specialized body fluid. It has four main components: plasma, red blood cells, white blood cells, and platelets.

# 

## Practical topic: RBC count

## Lecturer/tutor’s name:

## Date:

## 3 hours

RBC count is a blood test that measures how many red blood cells (RBCs) we have,The test can help diagnose different kinds of anemia and other conditions affecting red blood cells.Normal RBC ranges are: Male: 4.7 to 6.1 million cells per microliter (cells/mcL), and for Female: 4.2 to 5.4 million cells/mcL.

## Practical topic: WBC Count

## Lecturer/tutor’s name:

## Date:

## 3 hours

A white blood cell (WBC) count is a test that measures the number of white blood cells in our body. Purpose of a WBC count Having a higher or lower number of WBCs than normal may indicate an underlying condition. A WBC count can detect hidden infections within our body and alert doctors to undiagnosed medical conditions, such as [autoimmune diseases](https://www.healthline.com/health/autoimmune-disorders), [immune deficiencies](https://www.healthline.com/health/immunodeficiency-disorders), and [blood disorders](https://www.healthline.com/health/blood-cell-disorders). This test also helps doctors monitor the effectiveness of [chemotherapy](https://www.healthline.com/health/chemotherapy) or [radiation treatment](https://www.healthline.com/health/radiation-therapy) in people with [cancer](https://www.healthline.com/health/cancer). Normal ranges include**:** newborns: 9,000 to 30,000, children under 2 years: 6,200 to 17,000, children over 2 years and adults: 5,000 to 10,000 per mcL of blood.

# 

## Lecturer/tutor’s name:

## Date:

## 4 hours: theoretical

**Respiratory system component and function, and Lung volumes and capacities**

In this lecture students get information about the respiratory system and learn that the primary function of the respiratory system is to supply the blood with oxygen in order for the blood to deliver oxygen to all parts of the body. The respiratory system does this through breathing. When we breathe, we inhale oxygen and exhale carbon dioxide. This exchange of gases is the respiratory system's means of getting oxygen to the blood. Respiration is achieved through the mouth, nose, trachea, lungs, and diaphragm. Oxygen enters the respiratory system through the mouth and the nose. The oxygen then passes through the larynx (where speech sounds are produced) and the trachea which is a tube that enters the chest cavity. In the chest cavity, the trachea splits into two smaller tubes called the bronchi. Each bronchus then divides again forming the bronchial tubes. The bronchial tubes lead directly into the lungs where they divide into many smaller tubes which connect to tiny sacs called alveoli. The average adult's lungs contain about 600 million of these spongy, air-filled sacs that are surrounded by capillaries. The inhaled oxygen passes into the alveoli and then diffuses through the capillaries into the arterial blood. Meanwhile, the waste-rich blood from the veins releases its carbon dioxide into the alveoli. The carbon dioxide follows the same path out of the lungs when you exhale.

## Practical topic: Hemoglobin

## Lecturer/tutor’s name:

## Date:

## 3 hours

Hemoglobin is a protein in your red blood cells that carries oxygen to your body's organs and tissues and transports carbon dioxide from your organs and tissues back to your lungs. If a hemoglobin test reveals that your hemoglobin level is lower than normal, it means you have a low red blood cell count (anemia).The principle of Sahli's Method or Acid hematin method is quite easy that when the blood is added to N/10 Hydrochloric acid (HCl), the hemoglobin present in RBCs is converted to acid hematin which is a dark brown colored compound.

## 

## Practical topics: Spirometry test

## Lecturer/tutor’s name:

## Date:

## 3 hours

In this lab students learn Spirometry which is the most common type of breathing or pulmonary function test. This test measures how much air a person can breathe in and out of their lungs, as well as how easily and fast you can blow the air out of your lungs. Spirometry tests may be done in the presence of symptoms like wheezing, shortness of breath, or a cough. This test can help diagnose problems such as asthma and chronic obstructive pulmonary disease (COPD). It can also be done to check lung function before a surgery.

# 

# Chapter number: Four (Human Digestive and Excretory system)

## Lecturer/tutor’s name:

## Date:

## 2 hours: theoretical

**Components of the digestive system**

**Digestive system:** The system of organs responsible for getting food into and out of the body and for making use of food to keep the body healthy. The digestive system includes the salivary glands, mouth, [esophagus](https://www.medicinenet.com/image-collection/esophagus_picture/picture.htm), stomach, [liver](https://www.medicinenet.com/liver_anatomy_and_function/article.htm), gallbladder, pancreas, small intestine, colon, and rectum. The digestive system's organs are joined in a long, twisting tube from the mouth to the anus. Inside this tube is a lining called the mucosa. In the mouth, stomach, and small intestine, the mucosa contains tiny glands that produce juices to help digest food. Two solid organs, the liver and the pancreas (both of which are embryologically derived from the digestive tract), produce digestive juices that reach the intestine through small tubes known as ducts. In addition, parts of other organ systems (for instance, nerves and blood) play a major role in the digestive system.

## Practical topic: Body Mass Index (BMI)

## Lecturer/tutor’s name:

## Date:

## 3 hours

**Body mass index (BMI)** is an estimate of body fat based on height and weight. It doesn’t measure body fat directly, but instead uses an equation to make an approximation. BMI can help determine whether a person is at an unhealthy or healthy weight.

## Lecturer/tutor’s name:

## Date:

## 2 hours: Theoretical

**Mechanism of Food Digestion and Absorption**

In this lecture Mechanism of Food Digestion and Absorption will be discussed. Digestion includes both mechanical and chemical processes. Mechanical digestion is a purely physical process that does not change the chemical nature of the food. Instead, it makes the food smaller to increase both surface area and mobility.In chemical digestion, starting in the mouth, digestive secretions break down complex food molecules into their chemical building blocks (for example, proteins into separate amino acids). These secretions vary in composition, but typically contain water, various enzymes, acids, and salts. The process is completed in the small intestine.Food that has been broken down is of no value to the body unless it enters the bloodstream and its nutrients are put to work. This occurs through the process of absorption, which takes place primarily within the small intestine. There, most nutrients are absorbed from the lumen of the alimentary canal into the bloodstream through the epithelial cells that make up the mucosa. Lipids are absorbed into lacteals and are transported via the lymphatic vessels to the bloodstream (the subclavian veins near the heart). The details of these processes will be discussed later.

## Practical topic: Blood sugar test

## Lecturer/tutor’s name:

## Date:

## 3 hours

In this lab students will be familiar with Blood sugar, which is also known as blood glucose,it comes from the food you eat. Your body creates blood sugar by digesting some food into a sugar that circulates in your bloodstream. Blood sugar is used for energy. The sugar that isn’t needed to fuel your body right away gets stored in cells for later use.A blood sugar test is a procedure that measures the amount of sugar, or glucose, in your blood. This test helps diagnose diabetes. People with diabetes can also use this test to manage their condition.Too much sugar in your blood can be harmful.

## Lecturer/tutor’s name:

## Date:

## 4 hours: Theoretical

**Constituents of the Excretory system and Mechanism of Excretion**

The Excretory system is responsible for the elimination of wastes produced by homeostasis. There are several parts of the body that are involved in this process, such as sweat glands, the liver, the lungs and the kidney system. Humans have two kidneys and each kidney is supplied with blood from the [renal artery](https://en.wikipedia.org/wiki/Renal_artery). The kidneys remove from the blood the nitrogenous wastes such as urea, as well as salts and excess water, and excrete them in the form of urine. This is done with the help of millions of [nephrons](https://en.wikipedia.org/wiki/Nephrons) present in the kidney. The filtrated blood is carried away from the kidneys by the [renal vein](https://en.wikipedia.org/wiki/Renal_vein) (or kidney vein). The urine from the kidney is collected by the ureter (or excretory tubes), one from each kidney, and is passed to the urinary bladder. The urinary bladder collects and stores the urine until urination. The urine collected in the bladder is passed into the external environment from the body through an opening called the urethra.

## Practical topic: General urine examination (Physical) Lecturer/tutor’s name:

## Date:

## 3 hours

A urinalysis is a group of physical, chemical, and microscopic tests. The tests detect and/or measure several substances in the urine, such as byproducts of normal and abnormal [metabolism](https://labtestsonline.org/glossary/metabolism), cells, cellular fragments, and [bacteria](https://labtestsonline.org/glossary/bacterium). Urine is generally yellow and relatively clear, but each time a person urinates, the color, quantity, concentration, and content of the urine will be slightly different because of varying constituents. Many disorders may be detected in their early stages by identifying substances that are not normally present in the urine and/or by measuring abnormal levels of certain substances. Some examples include glucose, protein, bilirubin, red blood cells, white blood cells, crystals, and bacteria.

Physical urine examination includes estimation of color, odor, turbidity, and under microscope after centrifugation to presence of crystals, bacteria, pus cells, RBC, and other.

## Practical topic: Chemical urine examination

## Lecturer/tutor’s name:

## Date:

## 3 hours

## The chemical examination of urine is most commonly carried out in the surgery or outpatient clinic, by a nurse, using commercially prepared test strips. These are narrow plastic strips that hold test pads, arranged in a row. The test pads have chemicals in them. chemical urine examination include; acidity or alkalinity, protein, glucose, ketones, nitrite,urobilinogen, and bilirubin.

# Chapter number: Five (Endocrine system)

## Lecturer/tutor’s name:

## Date:

## 2 hours: theoretical,

**Hormone and their types with function**

The endocrine system is a control system of ductless glands that secrete hormones within specific organs. Hormones act as "messengers," and are carried by the bloodstream to different cells in the body, which interpret these messages and act on them.Without hormones, you could not grow, maintain a constant temperature, produce offspring, or perform the basic actions and functions that are essential for life.There are two types of hormones secreted in the endocrine system: Steroidal and non-steroidal, (or protein based) hormones and The endocrine system regulates its hormones through negative feedback. Increases in hormone activity decrease the production of that hormone except in very specific cases like childbirth.

## Practical topics: Thyroid-Stimulating hormone (TSH)

## Lecturer/tutor’s name:

## Date:

## 3 hours

Thyroid-stimulating hormone (also known as thyrotropin, thyrotropic hormone, or abbreviated TSH) is a [pituitary hormone](https://en.wikipedia.org/wiki/Pituitary_hormone) that stimulates the [thyroid](https://en.wikipedia.org/wiki/Thyroid) gland to produce [thyroxine](https://en.wikipedia.org/wiki/Thyroxine) (T4), and then [triiodothyronine](https://en.wikipedia.org/wiki/Triiodothyronine) (T3) which stimulates the metabolism of almost every tissue in the body. It is a [glycoprotein](https://en.wikipedia.org/wiki/Glycoprotein) hormone produced by [thyrotropic](https://en.wikipedia.org/wiki/Thyrotrope) cells in the [anterior pituitary gland](https://en.wikipedia.org/wiki/Anterior_pituitary_gland), which regulates the endocrine function of the [thyroid](https://en.wikipedia.org/wiki/Thyroid).The normal range of TSH levels is 0.4 to 4.0 milli-international units per liter. If you're already being treated for a thyroid disorder, the normal range is 0.5 to 3.0 milli-international units per liter. A value above the normal range usually indicates that the thyroid is underactive.

# Chapter number: Six (Lymphatic System)

## Lecturer/tutor’s name:

## Date:

## 2 hours: Theoretical

**Lymphatic System Components and Functions**

In this lecture students learn about the lymphatic system, or lymphoid system, which is an organ system in vertebrates that is part of the circulatory system and the immune system. It is made up of a large network of lymph, lymphatic vessels, lymph nodes, lymphatic or lymphoid organs, and lymphoid tissues

## Practical topics:

## Lecturer/tutor’s name:

## Date:

## 3 hours

Immunoglobulin G (IgG), the most abundant type of antibody, is found in all body fluids and protects against bacterial and viral infections. Immunoglobulin M (IgM), which is found mainly in the blood and lymph fluid, is the first antibody to be made by the body to fight a new infection. Once an antibody is produced against a specific antigen, the next time that antigen enters the body, the immune system “remembers” its response and produces more of the same antibodies. In that way, checking for the presence of specific immunoglobulins in the blood can be helpful in diagnosing or ruling out infections or certain other illnesses. Doctors also rely on the immunoglobulin test as one of the tools to help diagnose immunodeficiencies (when the immune system isn’t working properly). A person can be born with an immunodeficiency or acquire it through infection, disease, malnutrition, burns, or as a side effect of medicines. Doctors may suspect an immunodeficiency in a child who experiences frequent or unusual infections. Immunoglobulin levels are also used as part of an evaluation for autoimmune conditions such as juvenile idiopathic arthritis, lupus, and celiac disease

# Type of exams questions

**Q1: Multiple choice questions**

1.Which intermolecular process primarily drives the formation of a bilayer when phospholipids are added to water?

1. Lipids cause water to arrange in an ordered, unfavorable cage-like structure. Forcing lipids into a bilayer reduces this effect
2. Phospholipids self-assemble into a bilayer due to the strong affinity they have for each other.
3. The ordered arrangement of a bilayer is more favorable than the disordered state of individual free floating phospholipids.
4. A bilayer arrangement maximizes the strength of Van der Waals forces among phospholipids.

2. All of the following are functions of the circulatory system EXCEPT?

1. hermoregulation
2. Transport of oxygen, carbon dioxide, nutrients, and waste products
3. Hematopoiesis
4. Transport of hormones and antibodies

3.Which of the following is NOT a formed element of blood?

1. Red Blood Cells
2. White Blood Cells
3. Plasma
4. Platelets

4. Which acid is produced by the stomach?

1. Sulfuric acid
2. Hydrochloric acid
3. Nitric acid
4. Salfa salicylic acid

**Q2: answer these questions:**

1.Describe the similarities and differences between the processes of diffusion and osmosis.

2. What is the food called when food blends completely with acidic gastric juices of the stomach by the churning movements of the muscular wall?

3. Research shows that overweight people may develop type 2 diabetes.

Body Mass Index (BMI) can be used to identify people who are overweight. BMI can be calculated using the equation:

BMI =mass in kilogramsheight in metres \times height in metres

Calculate the BMI for a person who has a mass of 77 kilograms and a height of 1.6 metres

**Q3/ Define the following terms:**

1.Excretion system

2.Estrogens Hormone

3. Asthma

4--The soma

# Typical answers for above exam questions

**Q1**

1.a.Lipids cause water to arrange in an ordered, unfavorable cage-like structure. Forcing lipids into a bilayer reduces this effect

2.b.Transport of oxygen, carbon dioxide, nutrients, and waste products

3.c. Plasma

4.b.Hydrochloric acid

**Q2**

1.

1. all gases and liquids move by diffusion
2. only water moves by osmosis
3. molecules move from high to low concentration in both processes
4. this means molecules move down a concentration gradient
5. osmosis must occur across a partially permeable membrane
6. neither process requires energy

2. The food stays in the stomach for 4-5 hours during which it gets blended completely with the acidic gastric juice present in the stomach through churning movements of the muscular walls. At this point, the food is referred to as chyme.

3. Accept the 30.07 to 30.08, or 30.1.

**Q3**

1. Excretion is the process of removing wastes and excess water from the body. It is an essential process in all living things and a major way the human body maintains homeostasis.
2. Estrogen is a class of predominantly female sex hormones important for the development and growth of the female reproductive tract, secondary sex characteristics, the female reproductive cycle, and the maintenance of pregnancy
3. Asthma is a long-term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered bronchospasms.
4. The soma :(body) of the neuron contains the nucleus which acts as the cell's control centre, these contain many small neurofibrils which project from the nucleus into the dendrites.

# Extra notes

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

## 

# Peer review

I certify that:

1. I read and verify all requirements of teaching quality assurance are respected in this course book.
2. The scientific contents are new, convenient and well organized for this stage.
3. The order of chapters are well done.
4. References are new and available for students.

That’s why I signed up for this course book. And I take all the responsibilities.

**Name:**

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**College:**

**Department:**

**E-mail:**

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**Date:**

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