



**Ministry of Higher education and Scientific Research  
Al-Qasim Green University  
College of Veterinary Medicine**



- **Course Level:** Second Year Level
- **Course Name:** Theoretical Anatomy/2 hours
- **Course Name:** Practical Anatomy /3 hours
- **Semester:** First
- **Unit:** 4

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

This course will introduce the students to basic anatomical concepts including anatomic terminologies and directional terms. The course focuses on comparative gross anatomy of the bones, muscles, skin and other organs in different animals. The course focuses also on comparative gross anatomy of the viscera and other organs in different animals

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1-10	Digestive system General description of the digestive s. and embryological development mouth cavity and its content like the tongue and hard palate and soft palate with its muscles and cheeks and lips, blood and nerve supply of the tongue .salivary glands, pharynx and its layers and muscles and opening the hyoid apparatus(bones and muscles).	20
11-15	Nervous system Development of the brain .central nervous s. brain, parts of the brain (spinal cord, cranial nerves, spinal nerves). Autonomic nervous system :sympathetic division, meninges, cerebrospinal fluid.	10
Total		30

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1 and 2	General description of the skull	6
3	Cranial cavity ,nasal cavity ,hyoid bone ,mandible.	3
4	Skull comparative ,paranasal sinuses.	3
5 and 6	Cervical vertebrae comparative.	6
7	Oral cavity	3
8	Pharynx and esophagus	3
9 and 10	Viscera :stomach small intestine and large intestine: (comparative)	6
11	Liver (comparative)	3
12	The brain, cranial, and spinal meninges, parts of brain ,cranial nerves.	3



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13	Nasal cavity and larynx ,trachea	3
14	Anatomy of lungs (comparative)	3
15	Avian anatomy	3
Total		45

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- 1.Veterinary anatomy by Dyce-Wensing 2010
- 2.Anatomy of domestic animals by R-Getty



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This course will introduce the students to basic anatomical concepts including anatomic terminologies and directional terms. The course focuses on comparative gross anatomy of the bones, muscles, skin and other organs in different animals. The course focuses also on comparative gross anatomy of the viscera and other organs in different animals.

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1-6	Lymphatic system Introduction lymph, lymph vascular s. lymphatic tissue, tonsils, lymph nodes thymus ,spleen	12
7-12	Respiratory system Introduction ,nose ,nasal cavity ,nasopharynx , paranasal sinuses, larynx, trachea, lung thoracic cavity, pleura	12
13-15	Cardiovascular system	6
Total		30

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1	The eye (tunics, muscles, nerves, chambers).	3
2 and 3	Dissection of neck region (lateral and ventral surfaces)including chief veins ,nerves ,arteries ,muscles ,thyroid gland lymph nodes ,trachea, esophagus	6
4	Dissection of neck region	3
5 and 6	Dissection of thorax ,thoracic fascia ,muscles of thoracic wall respiratory muscles, internal thoracic fascia pleura pulmonary ligament ,thymus ,lung comparative ,trachea ,bronchial tree	6
7	Aortic arch ,common brachiocephalic trunk with its branches	3
8	Diaphragm	3
9 and 10	Superficial dissection of face region (muscles ,nerves ,arteries ,veins).	6
11 and 12	Deep dissection of face region (muscles ,nerves ,arteries ,veins	6



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	,parotid auricular region ,Buccal region mental region).	
13	Lymph centers in abdominal cavity ,spleen	3
14 and 15	Abdominal aorta with its branches distribution of autonomic nervous system in region behind diaphragm	6
Total		45

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
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- **Course Level:** Second Year Level
- **Course Name:** Theoretical Histology/2 hours
- **Course Name:** Practical Histology/3 hours
- **Semester:** First
- **Unit:** 4

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

The fundamental principles of histology, the microscopic study of body tissues and organ systems in domestic animals, are presented in lecture and laboratory formats.

**Course Contents**

<b>Course Content</b>		
<b>week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Theoretical Subject</b>	
1-4	Introduction: Definition of histology and its relation to other sciences, microscopic measurements, basic histology techniques , cytology	8
5	Epithelial tissue	2
6	Connective tissue	2
7	Bone , cartilage , blood	2
8 and 9	Muscular tissue	4
10 and 11	Nervous tissue	4
12 and 13	Digestive system	4
14 and 15	Accessory gland of digestive tract	4
Total		30

**Course Contents**

<b>Course Content</b>		
<b>week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Practical Subject</b>	
1	General information, working in the laboratory ,using and maintaining microscopic, structure and type of cell,	3
2	Epithelial tissue : Different types of epithelial tissue	3
3	Connective tissue general	3
4	Compact bone	3
5	Spongy bone	3
6	Cartilage	3
7	blood	3
8	Muscle tissue	3
9	Nervous tissue	3
10	Digestive system	3
11	Oral cavity: Tongue structure	3
12	Salivary gland	3
13	Fundic gland region of stomach	3
14	Small intestine and large intestine	3



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15	Liver , gall bladder , pancreas	3
Total		45

**Mode of Assessment**

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Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- 1.Text book of veterinary histology by DON A-Samuelson .2010
- 2.Text book of veterinary histology by Dellmann and Brown .2007



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- **Course Level:** Second Year Level
- **Course Name:** Theoretical Histology/2 hours
- **Course Name:** Practical Histology/3 hours
- **Semester:** Second
- **Unit:** 4

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

The fundamental principles of histology, the microscopic study of body tissues and organ systems in domestic animals, are presented in lecture and laboratory formats.

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1 and 2	Cardiovascular system	4
3 and 4	Urinary system	4
5 and 6	Endocrine system	4
7 and 8	Male reproductive system	4
9-11	Female reproductive system	6
12 and 13	Respiratory system	4
14	Skin	4
Total		30

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1	Respiratory system	3
2 and 3	Endocrine gland	6
4 and 5	Urinary system	6
6 and 7	Male genital system	6
8 and 9	Female genital system	6
10	skin	3
11	Lymph system	3
12	Cardiovascular system	3
13	Mammary gland	3
14	Review	3
15	Exam	3
Total		45



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**Mode of Assessment**

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Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

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- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Physiology/4 hours
- **Course Name:** Practical Physiology/2 hours
- **Semester:** First
- **Unit:** 5

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

1. To provide students with important knowledge about of the major physiological systems, and be able to associate anatomical areas with their specific function.
2. To make students understand the role of evolutionary processes(e.g. natural selection) in driving the organization of physiological systems. .
3. To make students familiar with physiological challenges animals face, how those challenges vary in relation to the animals' environment, and the processes by which animals deal with these challenges.
4. Students will be trained on how they deal with describe structural differences of major physiological systems that characterize different taxonomic groups of animals.
5. To make students familiarized with relate physiological processes, from the biochemical to the system level, to the function of the entire organism in its environment.

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1	Introduction to physiology	1
2	The cell and its function(Organization of the cell, membranous structures of the cell, cytoplasm and its organelles functional systems of the cell, Transport of substances through the cell membrane, radiation and metabolism of energy)	5
3	Nerve(structure of the nerve cell, membrane potentials and action potentials, origin of the normal resting membrane potential, nerve action potential, initiation of the action potential, special characteristics of signal transmission in nerve trunks, synapses, neurotransmitters and the neuromuscular junction.	5
4	Muscle(types of muscles and structures, General mechanism of muscle contraction, molecular mechanism of muscle contraction, molecular characteristics of the contractile filaments energetic of muscle contraction, characteristics of whole muscle contraction, mechanics of skeletal muscle contraction, rigor moris and physiology of cardiac muscle).	5
5	The autonomic nervous system (General organization of the autonomic nervous system, physiologic anatomy of the sympathetic nervous system, physiologic anatomy of the parasympathetic nervous system, chemical transmission at autonomic junctions, basic characteristics of sympathetic and parasympathetic function, receptors on the effector organs, effects of sympathetic and parasympathetic stimulation on	3



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	specific organs "Alarm " or "Stress" response of the sympathetic nervous system and system and control of the autonomic nervous system).	
6	Blood composition and physiology(formed elements, functions of the blood, erythrocytes, erythropoiesis, hemoglobin, reactions of hemoglobin, white blood cells, chemotaxis, platelets, plasma proteins, blood coagulation, blood groups, immunity.	9
7	Lymph: Composition and function.	1
8	Cerebrospinal fluid: Composition and function.	1
9	Cardiovascular system(structure of the heart, and course of blood flow through the heart chambers and heart valves, cardiac cycle, heart sounds, the electrocardiogramcardiac output, blood flow in vessels, blood pressure, capillary circulation, venous circulation, cardiovascular regulatory mechanisms, innervations of blood vessels, cardiac innervation, vasomotor center, baroreceptors and blood-brain barrier).	10
10	Respiration (functional structures, mechanics of pulmonary ventilation, partial pressure of gases in alveolar and blood, surfactant, surface tension, and collapse of the alveoli, pulmonary volumes, pulmonary capacities, alveolar ventilation, dead space and its effect on alveolar ventilation, functions of the respiratory. Passageways, mechanics of respiration, transport of gases in the blood and regulation of respiration)	6
11	Digestive system: salivary glands and saliva, structures of digestive system, gastric secretion, regulation of gastric secretion, exocrine portion of the pancreas, liver and biliary system, small intestine, intestinal secretion, intestinal motility, large intestine, defecation, absorption, rumination, microbiology of the rumen.	14
Total		60

**Course Contents**

<b>Course Content</b>		
<b>week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Practical Subject</b>	
1	Introduction to apparatus and instruments.	2
2	Fragility of Red Blood cell.	2
3	Red blood cell count.	2
4	White blood cell count.	2
5	Differential leukocyte count	2
6	Estimation of hemoglobin	2
7	Estimation of packed cell volume	2
8	Estimation of erythrocyte sedimentation	2
9	The Wintrobe erythrocyte indexes	2
10	Blood groups	2
11	Coagulation time	2



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12	Bleeding time	2
13	Blood pressure	2
14	Effect of exercise and gravity on blood pressure and venous pressure	4
Total		<b>30</b>

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- Ganong, W.F.(2011). Review of Medical Physiology. 20th Edition. Lange Medical Books/McGraw-Hill Medical Publishing Division. USA; p.543.
- Guyton,A.C. and Hall,J.E.(2011). Textbook of medical physiology. 11<sup>th</sup> Ed. Saunders Company
- Vander, A.; Sherman, J. and Lucianoo, D.(2001). Human physiology, 7<sup>th</sup> Ed. WCB/Graw Hill Co.Inc. New York, U.S.A
- Germann,W.J. and Stanfield,C.L.(2002). Principles of human physiology. Benjamin Cumming, San Francisco Boston New York.
- Cunningham,J.G.(2002). Textbook of Veterinary Physiology, 3<sup>rd</sup> Ed.,W.B. Saunders Co. 341-8.
- McDonald,D.V.M.(2003). Veterinary endocrinology and reproduction, 2<sup>nd</sup> Ed. Lea and Febiger. Philadelphia.
- Walter H. Hsu .Handbook of Veterinary Pharmacology 1st Edition



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- **Course Name:** Theoretical Physiology
- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Physiology/4 hours
- **Course Name:** Practical Physiology/2 hours
- **Semester:** Second
- **Unit:**5

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

- 1.To provide students with important knowledge about of the major physiological systems, and be able to associate anatomical areas with their specific function.
- 2.To make students understand the role of evolutionary processes(e.g. natural selection) in driving the organization of physiological systems. .
- 3.To make students familiar with physiological challenges animals face, how those challenges vary in relation to the animals' environment, and the processes by which animals deal with these challenges.
- 4.Students will be trained on how they deal with describe structural differences of major physiological systems that characterize different taxonomic groups of animals.
- 5.To make students familiarized with relate physiological processes, from the biochemical to the system level, to the function of the entire organism in its environment.

**Course Contents**

<b>Course Content</b>		
<b>week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Theoretical Subject</b>	
1-3	Central Nervous system: Brain, brain stem, medulla oblongata, reticular formation of the brain stem, thalamus, hypothalamus, temperature regulation, sensory system, motor system (spinal cord and reflexes), learning and memory and limbic system.	12
4-8	Endocrine system: the relationship between nervous system and endocrine glands, hormones, types of hormones, mechanisms of hormone action, pituitary gland, thyroid gland, hormonal control of calcium metabolism, parathyroid glands, adrenal gland, pancreatic hormones, prostaglandins, atrial natriuretic peptide, pineal gland and thymus gland.	20
9-11	Male and female reproductive system: structures, spermatogenesis, structure of mature spermatozoon, endocrine function of the testes and control of testicular function. Structure of female reproductive system, types of follicles, estrous cycle, menstrual cycle, ovarian cycle, uterine cycle, vaginal cycle, puberty, ovarian hormones, abnormalities of ovarian functions. Pregnancy, placental hormones, parturition and lactation.	14
12-14	Kidney: nephron structure and blood supply, plasma volume, total blood volume, glomerular filtration, factors affecting the GFR, tubular function, tubular secretion, water excretion, osmotic diuresis, diuretics, factors affecting sodium excretion, regulation of potassium excretion, functions of ureter and urinary bladder.	10
15	Acid-base balance: Chemical buffer, regulation of CO <sub>2</sub> concentration by the	4



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	respiratory system, regulation of plasma $\text{HCO}_3^-$ concentration by the kidney, fate of $\text{H}^+$ in the urine and body fluids.	
Total		60

<b>Course Content</b>		
week	Topics	Hours
	<b>Practical Subject</b>	
1	Lung volumes(measurement of respiratory volume spirometry).	2
2	Measurement of pulmonary ventilation and respiratory movements.	2
3	Urine examination.	2
4	Frog sciatic nerve and gastronemius muscle preparation.	2
5	The simple muscle twitch.	2
6	The effect of temperature on muscle contraction.	2
7	Effect of stimulus strength on muscle contraction and fatigue.	2
8	Summation of two stimuli and tetanus.	2
9	Frogs heart(sequence of the heart beat and effect of acetylcholine on heart).	2
10	Extrasystole and compensatory pause and Stannius ligatures.	2
11	Evaluation of seminal quality.	2
12	Estrous cycle of the rat.	2
13	Overiectomy in rat.	2
14	Concentration of spermatozoa	2
15	Review	2
Total		30

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
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- Agamemnon Despopoulos, M.D. and Stefan Silbernagl, M.D.(2003). Color Atlas of Physiology.



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- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Biochemistry/3 hours
- **Course Name:** Practical Biochemistry/2 hours
- **Semester:** First
- **Unit:** 4

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

Teaching of principles of physical chemistry as applicable to veterinary sciences, which includes:

- demonstrate knowledge and understanding of the molecular machinery of living cells.
- demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition.
- demonstrate knowledge and understanding of the principles and basic mechanisms of metabolic control and molecular signaling

**Course Contents**

<b>Course Content</b>		
<b>week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Theoretical Subject</b>	
1-2	<b>Cell biochemistry</b>	4
2	<b>Carbohydrate Metabolism</b> Chemistry of Carbohydrates, function of carbohydrates, Digestion and absorption of Carbohydrates, Glycolysis, Gluconeogenesis, Glycogen metabolism, Pentose phosphate pathway.	13
3	<b>Hormones</b> Introduction, mechanism of action of hormones, signal transduction.	7
4	<b>Integrative Metabolism Bioenergetics</b> Introduction , Formation and utilization of ATP , Kreb's cycle, Function and regulation of kreb's cycle, Electron transport system and oxidative Phosphorylation.	6
5	<b>Amino acids and Proteins</b> Classification of amino acids , Properties of amino acids Proteins ,Classifications of proteins , structures of proteins , denaturaion of proteins , Digestion and absorption of proteins . Amino acid catabolism , Nitrogen balance, excretion and the urea cycle.	7
6	<b>Enzymes</b> Principles and classifications of Enzymes , Mechanism action of Enzymes , Enzyme Inhibition, Regulation of Enzyme activity.	6
	Exam	2
Total		45



### Course Contents

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1	General instruction ,Carbohydrates	2
3	General qualitative test	2
4	Unknown of carbohydrates	2
5	glycogens	2
6	Proteins : Fibros proteins	2
8	Separation of albumin and globin by precipitation	2
9	Glycoprotein	2
10	Phosphoprotein : Enzymes	2
12	Amyolytic activity of amylase	2
13	Effect of pH on amylase activity.	2
14	Effect of temperature on amylase activity	2
15	Urine: Physical properties of urine	2
17	Normal and abnormal constituents of urine	2
18	Unknown of urine	2
19	Exam	2
Total		30

### Mode of Assessment

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
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Practical Exam	10	10-11 <sup>th</sup> weeks
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Final Exam	60	After the 16 <sup>th</sup> .

### Textbooks and Recommended References

- Medical biochemistry (Solomon Adugna , Lakshmi Ahuja Mekonnen Alemu )
- Text book of veterinary physiological chemistry / Second Edition ( Larry R. Engelking)





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- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Biochemistry/3 hours
- **Course Name:** Theoretical Biochemistry/2 hours
- **Semester:** Second
- **Unit:**4

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

Teaching of principles of physical chemistry as applicable to veterinary sciences, which includes:

- demonstrate knowledge and understanding of the molecular machinery of living cells.
- demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition.
- demonstrate knowledge and understanding of the principles and basic mechanisms of metabolic control and molecular signaling

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1-5	<b>-Lipid Metabolism</b> Classification of Lipids , Digestion and absorption of Lipids , Metabolism of Fatty acids , $\beta$ -Oxidation of Fatty acids , Biosynthesis of Fatty acids, Cholesterol , Lipoproteins.	15
6-7	<b>- Hormones</b> Definition and classification, Biosynthesis, storage, transport , Cellular receptors , Chemical messengers , signal transduction , Mechanism action of hormones.	6
8-15	<b>-Nucleic acids</b> Structure of Nucleic acids , Types of Nucleic acids , Replication of DNA , RNA synthesis , transcription , Translation/Protein synthesis , The Genetic code.	22
	<b>Exam</b>	2
Total		45

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1	Photometric methods in biochemical analysis	4
2	Determinate of serum total protein	2
3	Calibration curve of protein	2
4	Determinate of serum amylase activity	2
5	Determinate of serum inorganic phosphate	2
6	Determinate of serum total calcium	2
7	Determinate of serum bilirubin	2





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8	Determinate of serum creatinine	2
9	Determinate of serum uric acid	2
10	Determinate of serum cholesterol	2
11	Enzymatic method for glucose	2
12	Determinate of serum total lipid	2
13	Determinate of serum urea	2
14	Exam	2
Total		30

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
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Final Exam	60	After the 16 <sup>th</sup> .

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- **Course level:** Second –year level
- **Course name:** Theoretical Animal nutrition/2 hours
- **Course name:** Practical Animal nutrition/2 hours
- **Semester:** First
- **Unit:** 3

**Course objective:**

To develop an understanding of the principle of nutrition and their application to meeting the nutrient requirements of livestock and other animal species.

**Course content**

<b>Course content</b>		
<b>Week</b>	<b>Topics</b>	<b>Hours</b>
	<b>Theoretical Subject</b>	
1	<b>Orientation and general information</b> Development of nutritional science, Animal nutrition: It's Role in Modern Agriculture and society, Definition of terms, Composition of animal feed, Composition of the Animal body,	2
2-3	Water and its function Properties and function of water, Absorption, distribution and turnover of water, Sources of water supply, Sources of water loss, Water requirement, Water restriction, Water Quality, Water regulation.	4
4-5	Carbohydrate metabolism Chemical forms and dietary sources, carbohydrate metabolism, Importance of glucose, Sources of blood glucose, Glycogen breakdown, Glucose anabolism, Glucose Utilization	4
6	Volatile fatty acid Sources of Volatile fatty acids, Ruminal production and absorption, Post-absorptive Metabolism, Post-hepatic tissues metabolism, metabolism In ruminant tissue	2
7-8	Lipid metabolism Classification of lipid, Structures and function of lipid, Lipid Anabolism, Lipid synthesis (lipogenesis), Lipid catabolism.	4
9-10	Protein metabolism Biological Functions and Properties, Composition and Structure, Structural classification, General properties of amino acids, Essential and nonessential amino acids, amino acid composition and protein quality, protein metabolism, Protein synthesis, Protein synthesis versus degradation animal responses to protein nutrition, Practical considerations.	4
11-12	Trace element Mineral classification, General minerals functions, Factors affecting requirements, Deficiencies and Excesses of minerals, Biological function-dietary sources-and deficiency symptoms of minerals.	4



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13-14	Vitamins Definition, Classification, Feature and General functions, fat soluble vitamins, biological function-dietary sources and deficiency symptoms, water soluble vitamin, biological function-dietary sources and symptoms.	4
15	Exam	2
Total		30

**Course content**

Course content		
Week	Topics	Hours
	<b>Practical Subject</b>	
1	Using the nutrition laboratory	2
2	Feedstuff approximate analysis	2
3,4	How take sample for analysis	4
5,6,7,8	Moisture determination in feedstuff green roughage,, milk, meat and egg	8
9	determination of ash	2
10	determination of silo	2
11,12	Preparing standard solution	4
13,14	determination of crude protein	4
15	First examination	2
Total		30

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- Animal nutrition/ 2002by Peter McDonald and Richard Alan Edwards
- Basic Animal nutrition and feeding/1998-2005 by Wilson G. Pond and David B. Church



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- **Course level:** Second –year level
- **Course name:** Theoretical Animal nutrition/2 hours
- **Course name:** Practical Animal nutrition/2 hours
- **Semester:** Second
- **Unit:** 3

**Course objective:**

To develop an understanding of the principle of nutrition and their application to meeting the nutrient requirements of livestock and other animal species

**Course content**

Week	Topics	hours
	<b>Theoretical Subject</b>	
1	The evolution of food:-digestibility	2
2	Energy content of food and partition	2
3,4	Symptoms of expressing the energy value of food	4
5,6	protein	4
7	Feeding standards from maintenance and growth A: ruminant	2
8	B:-rabbits.	2
9	C:-poultry	2
10	Feeding standards from reproduction and growth A:-ruminants	2
11	B:-rabbits	2
12	Effect of environment stress on the nutrition needs	2
13,14	Nutritional problems related to nutrition	4
15	exam	2
Total		30

**Course content**

Week	Topics	Hours
1,2	determination of fiber	4
3,4	determination of ether extract	4
5	determination of NFE BY calculated method	2
6	determination of gross energy by calculated method	2
7	Determination of energy by bomb calorimetric	2
8,9,10,11	Digestive trials	8
12,13,14	Making standard ration for farm animals	6
15	second examination	2
Total		30



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**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- Animal nutrition/ 2002 by Peter McDonald and Richard Alan Edwards
- Basic Animal nutrition and feeding/1998-2005 by Wilson G. Pond and David B. Church



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- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Genetic/2 hours
- **Semester:** First
- **Unit:** 2

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

1. Critically basic patterns of genetic inheritance.
2. Techniques for sequencing both nucleic acids and proteins, worked out the relationship between the two forms of biological molecules.
3. Understand the student of Chromosomal Mutation, Gene frequency, Linkage, crossing over and genetic map, selection and Method of matting

**Course Contents**

Course Contents		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1	Genetic history	1
2	Cell and Chromosome	1
3	Mandelian inheritance	1
4	Genetic Materials	1
5	Chromosomal Mutation	1
6	Gene interaction	1
7	Multiple alleles, Pseudoalleles	1
8	Exam	1
9	Gene frequency	1
10	Sex determination	1
11	Linkage, crossing over and genetic map	1
12	Selection	1
13	Method of matting	1
14	Resemblance between relatives	1
15	Exam	1
Total		15

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks And Recommended References**

- Genetics : analysis & principles / Robert J. Brooker. — 4th ed



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- **Course Level:** Second Year Level
- **Course Name:** Theoretical Embryology /2 hours
- **Semester:** Second
- **Unit:** 2

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

this course consist of detailed survey of the animal embryology involving lecture discussion , students who take this course will develop in depth understanding of embryo development .

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1	Introduction ,oogenesis , spermatogenesis	1
2 and 3	Fertilization ,cleavage , implantation	2
4	Trilaminar embryonic disc	1
5	Placentaion with classification	1
6	Development of urogenital system	1
7 and 8	Development of body cavity	2
9	Development of digestive system	1
10 and 11	Development of respiratory system	2
12 and 13	Development of nervous system	2
14 and 15	Development of cardiovascular system	2
Total		15

**Mode of Assessment**

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

**Textbooks and Recommended References**

- Essential of Domestic animal embryology by poul Hytte/fred sinowats .20107



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- **Course Level:** Second-Year Level
- **Course Name:** Theoretical Statistic /2 hours
- **Course Name:** Practical Statistic /2 hours
- **Semester:** Second
- **Unit:** 3

**Course Objectives**

**Upon completion of this course, the student should be familiarized with:**

To provide students with important knowledge about Biostatistics

To make students understand the specific topics include tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.

**Course Contents**

Course Content		
week	Topics	Hours
	<b>Theoretical Subject</b>	
1	Introduction to statistics and statistics symbols.	2
2	Tabular and graphical Presentation.	4
3	Measures of central tendency	2
4	Measures of dispersion or variation.	2
5	Elementary probability theory.	4
6	Discrete probability distribution.	2
7	Continuous probability distribution, normal distribution.	2
8	Simple regression and correlation.	2
9	Tests of hypothesis, Z-distribution.	4
10	T-distribution.	2
11	Chi-square distribution.	2
12	F-distribution.	2
Total		<b>30</b>





### Course Contents

Course Content		
week	Topics	Hours
	<b>Practical Subject</b>	
1	Introduction to statistics and statistics symbols.	2
2	Tabular and graphical Presentation.	4
3	Measures of central tendency	2
4	Measures of dispersion or variation.	2
5	Elementary probability theory.	4
6	Discrete probability distribution.	2
7	Continuous probability distribution, normal distribution.	2
8	Simple regression and correlation.	2
9	Tests of hypothesis, Z-distribution.	4
10	T-distribution.	2
11	Chi-square distribution.	2
12	F-distribution.	2
Total		<b>30</b>

### Mode of Assessment

Assessment	Score	Period
First Exam	10	10-11 <sup>th</sup> weeks
Second Exam	10	10-11 <sup>th</sup> weeks
Practical Exam	10	10-11 <sup>th</sup> weeks
Assignment, Projects, Quizzes, Tutorial	10	2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , and 7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> , 11 <sup>th</sup> .
Final Exam	60	After the 16 <sup>th</sup> .

### Textbooks and Recommended References

- Medical biochemistry (Solomon Adugna , Lakshmi Ahuja Mekonnen Alemu )
- Text book of veterinary physiological chemistry / Second Edition ( Larry R. Engelking)