

LESSON PLAN COMPILATION FOR GNM FIRST YEAR COURSE

## **Vol III : Bio-Sciences**

### **PART II**

➤ Anatomy & Physiology  
(Continued from Part I)

2016

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**Course : GNM First Year**

**Subject: Bio-Sciences**

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## List of Abbreviations and Expansions

<b>ADR</b>	Adverse Drug Reaction
<b>AV</b>	Audio Visual
<b>CHN</b>	Community Health Nurse
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>DDC</b>	Drug Distribution Centre
<b>DOTS</b>	Directly Observed Treatment Short course
<b>FTD</b>	Fever Treatment Depot
<b>G6PD</b>	Glucose 6 Phosphate Dehydrogenase
<b>GNM</b>	General Nursing and Midwifery
<b>ICN</b>	International Council of Nurses
<b>IM</b>	Intra Muscular
<b>IMR</b>	Infant Mortality Rate
<b>IQ</b>	Intelligence Quotient
<b>IRS</b>	Insecticide Residual Spray
<b>IV</b>	Intravenous
<b>L</b>	Listener
<b>MDGs</b>	Millennium Development Goals Maternal
<b>MMR</b>	Mortality Ratio
<b>NSAID</b>	Non-Steroidal Anti-inflammatory Drugs
<b>OHP</b>	Overhead Projector
<b>OTC</b>	Over The Counter
<b>PPT</b>	PowerPoint
<b>Q</b>	Question
<b>S</b>	Student
<b>SC</b>	Subcutaneous
<b>T</b>	Teacher
<b>UNICEF</b>	United Nations Children's Fund
<b>WHO</b>	World Health Organization

## LESSON PLAN

<b>SUBJECT</b>	: Anatomy and Physiology
<b>UNIT</b>	: Lymphatic System
<b>TOPIC</b>	: <b>Structure—Lymph Nodes</b>
<b>GROUP</b>	: G.N.M. 1 <sup>ST</sup> YEAR STUDENT
<b>PLACE</b>	: Class Room And Demonstration Room
<b>DATE AND TIME</b>	: 60 MINUTES
<b>TEACHING METHOD</b>	: Lecture Cum Demonstration

**AV AIDS / INSTRUCTIONAL AIDS:** Blackboard and Chalk, Chart, PPT

**STUDENT'S PRE REQUISITES:** students can explain the differences between the lymph and the blood, the composition of the lymph, functions of lymphatic system

**GENERAL OBJECTIVES** : At the end of the class students will be able to explain the lymph node , their structure and their functions

**SPECIFIC OBJECTIVES** : At The End Of The Class The Students Will Be Able To

1. Explain Structure Of Lymph Nodes.
2. Different Cells Of Lymph Nodes.

**Introduction:-** Lymph passess through vessels of increasing size and a varying number of lymph node before returning to the blood. the lymph node is the a type of type of lymphatic organ consists lymphatic tissue.

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
1.	5 min	Introduction- what are lymph tissues and organs	<b>Lymphoid tissue</b> <ul style="list-style-type: none"> <li>❖ The lymphoid tissues are the part of tissue macrophage system, also known as reticuloendothelial system.</li> <li>❖ Lymphoid tissues play an important role in immunological surveillance.</li> <li>❖ These are formed by aggregation of lymphocytes, macrophages, plasma cells and dendritic cells arranged on a background framework of reticular fibres.</li> <li>❖ They help to destroy bacteria, foreign bodies, old RBCs and WBCs.</li> <li>❖ The lymphoid tissue can be primary or secondary.</li> <li>❖ Primary lymphoid organs- generate new lymphocytes from stem cells. Ex- bone marrow and thymus gland</li> <li>❖ Secondary lymphoid organs- contain mature B and T lymphocytes and hence help in initiating immunological response. Ex- lymph nodes, spleen. Palatine tonsils and peyer's patches.</li> </ul>	T:- discuss with black board and chart  T:- listen attentively	Differentiate primary and secondary lymphoid organs.

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
2.	10 min	Lymph nodes- a secondary lymphoid organ	<p><b>LYMPH NODES:-</b></p> <ul style="list-style-type: none"> <li>❖ Oval or bean shaped organ lie often in group, along the length of lymph vessels. The lymph drains through a number of lymph nodes, usually 8-10, before returning to the venous circulation. They varies in size from pin head to almond shape.</li> <li>❖ Small masses of lymphoid tissues, usually present in groups along the course of lymphatic vessels.</li> <li>❖ As rule lymph from any part of the body passes through one or more lymph nodes before entering the blood stream.</li> <li>❖ Lymph nodes act as filters removing bacteria and other particulate matter from lymph.</li> <li>❖ Lymphocytes are added to lymph in these nodes. Each group of lymph nodes has a specific area of drainage.</li> <li>❖ Each lymph node consists of a connective tissue framework and of numerous lymphocytes and other cells, that fill the interstices of the network.</li> </ul>	<p>T:- explain with black board and chart</p> <p>T:- listen attentively</p>	What are lymph nodes?



S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
3.	10 min	Structure of lymph node	<p><b>STRUCTURE OF LYMPH NODE:-</b></p> <ul style="list-style-type: none"> <li>❖ Oval- Bean- shaped.</li> <li>❖ Concave surface is called the hilum, through which blood vessels enter and leave the lymph node.</li> <li>❖ Several lymph vessels enter the node on its convex surface.</li> <li>❖ The lymph node is covered by a connective tissue capsule.</li> <li>❖ A number of septa extends into the node from the capsule, dividing the node into a number of lobules.</li> <li>❖ Lymph node has an outer cortex and inner medulla.</li> <li>❖ The cortex does not extend into the hilum.</li> </ul> <p><b>Cortex-</b> made up of densely packed lymphocytes. There are several rounded masses of lymphocytes, called lymphatic follicles or lymphatic nodules.</p> <p><b>Medulla</b> – in this zone, the lymphocytes are arranged in the form of branching and anastomosing cords. The remaining space within the node is filled by a network of reticular fibres</p>	<p>T:- describe with black board and chart</p> <p>T:- listen attentively</p>	Explain the tissues in cortex of lymph node.

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
			<p><b>Capsule-</b> lymph node is surrounded by a capsule. The capsule consists mainly of collagen fibres. Some elastic fibres and some smooth muscles may be present. Just below the capsule is the capsular sinus. A number of septa extend into the node from the capsule and divide the node into lobules. it forms the partition called trabeculae.</p> <ul style="list-style-type: none"> <li>• As many as four or five afferent lymph vessels may enter a lymph node while only one efferent vessel carries lymph away from the node.</li> <li>• They found superficial and deep:- <ul style="list-style-type: none"> <li>✓ Cervical nodes:- drain lymph from head and neck</li> <li>✓ Axillary nodes:- upper limb, breast</li> </ul> </li> <li>• Lymph from organs and tissue in the thoracic cavity drains through group of nodes situated close to the mediastinum, large airways, esophagus and chest wall.</li> <li>• Lymph from pelvic and abdominal cavities form various nodes drain in cysterna chili</li> </ul>		

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
			<ul style="list-style-type: none"> <li>From lower limbs :- nodes behind the knee and in the groin</li> </ul>		
		Functions of lymph nodes	<ul style="list-style-type: none"> <li>❖ Centers of lymphocytes production. Both B and T lymphocytes are formed here.</li> <li>❖ phagocytosis of bacteria and other particulate matter.</li> <li>❖ Plasma cells (B- lymphocytes) produce antibodies against invading antigens.</li> <li>❖ T- lymphocytes attack the cells that are foreign to the host body.</li> </ul>	Lecture cum discussion	Differentiate function of T and B lymphocytes

## **Summary-**

In this lesson plan discussed about the following about the lymph nodes

1. Explain structure of lymph nodes
2. Different cells of lymph nodes.
3. Functions of lymph nodes

## **Assignment-**

1. What are lymph nodes?
2. Explain the structure of a lymph node with a labelled diagram.
3. Explain functions of lymph nodes.

## **Bibliography-**

- Ashalatha p r, deepa g, textbook of anatomy and physiology for nurses, 4<sup>th</sup> edn., 2015, jaypee publication, pgs 102-104.
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n . 136-137
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 671-675

## LESSON PLAN

<b>Subject</b>	: Bio-science
<b>Unit</b>	: Lymphatic system
<b>Topic</b>	: <b>Functions—lymph vessels</b>
<b>Group</b>	: G.N.M. 1 <sup>st</sup> year student
<b>Place</b>	: Class room and demonstration room
<b>Date and time</b>	: 60 minutes
<b>Teaching method</b>	: Lecture cum demonstration
<b>Av aids / instructional aids</b>	: Blackboard and chalk, chart and PPT
<b>Student's pre requisites</b>	: Students can explain the differences between the lymph and the blood, the composition of the lymph and the structure of different lymph vessels
<b>General objectives</b>	: At the end of the class students will be able to understand about the lymph, the lymph vessels and their gross and fine structure with their functions.
<b>Specific objectives</b>	: At the end of the class the students will be able to:- <ol style="list-style-type: none"><li>1. Define lymphatic system.</li><li>2. Enlist Components of the lymphatic system.</li><li>3. Enumerate Lymph and its composition.</li><li>4. Enlist functions of lymph and lymphatic system.</li></ol>

**Previous knowledge:** - student has some knowledge about immune system.

**Introduction:** - all of you are well known about the various diseases and why they cure immediately or certain period of time because our body respond to the specific antigen or pathogen and develop immune response or antibody that defend against the infection.

S. NO.	TIME	SPECIFIC OBJECTIVES	CONTENT	TEACHING LEARNING ACTIVITY	EVALUATION
1.	05 min.	Define lymphatic system.	<b><u>DEFINE OF LYMPHATIC SYSTEM:-</u></b> Lymphatic system is a closed system of vessels which draws the extra tissue fluid into the blood vascular system.	Teacher defined lymphatic system with the help of chalk board and PPT. Student listens attentively and takes notes.	Define lymphatic system?

S. NO.	TIME	SPECIFIC OBJECTIVES	CONTENT	TEACHING LEARNING ACTIVITY	EVALUATION
2.	15 min.	Enlist Components of the lymphatic system.	<p><b><u>LYMPH AND LYMPH VESSELS:-</u></b></p> <ul style="list-style-type: none"> <li>• Lymph</li> <li>• Lymph capillaries</li> <li>• Lymph vessels proper</li> <li>• Terminal lymph ducts</li> </ul> <p><b><u>LYMPHOID TISSUE:-</u></b></p> <ul style="list-style-type: none"> <li>• Lymph nodes</li> <li>• Spleen</li> <li>• Tonsils</li> <li>• Thymus</li> <li>• Bone marrow</li> </ul>	Teacher Enlist Components of the lymphatic system with the help of chalk board and PPT. Student listens attentively and takes notes.	Enlist the components of the lymphatic system?

S. NO.	TIME	SPECIFIC OBJECTIVES	CONTENT	TEACHING LEARNING ACTIVITY	EVALUATION
3.	15 min.	Enumerate Lymph and its composition.	<p><b><u>LYMPH AND ITS COMPOSITION:-</u></b></p> <ul style="list-style-type: none"> <li>• The tissue fluid which enters the lymphatic system is known as lymph.</li> <li>• Lymph carries particulate material, colloids and macromolecules from tissue fluid.</li> <li>• This maintains the low protein concentration of tissue fluid.</li> <li>• Lymphocytes are the most abundant component of the lymph.</li> <li>• Usually, lymph is a clear and colorless fluid.</li> <li>• It is formed by 96% water and 4% solids.</li> </ul>	<p>Teacher</p> <p>Enumerates Lymph and its composition with the help of chalk board and PPT.</p> <p>Student listens attentively and takes notes.</p>	Enumerate Lymph and its composition?



S. NO.	TIME	SPECIFIC OBJECTIVES	CONTENT	TEACHING LEARNING ACTIVITY	EVALUATION
4.	15 min.	Enlist functions of lymph and lymphatic system.	<p><b><u>FUNCTIONS OF LYMPH AND LYMPHATIC SYSTEM:-</u></b></p> <ul style="list-style-type: none"> <li>• It helps to maintain interstitial tissue pressure.</li> <li>• Lymph carries protein molecules, electrolytes and other macromolecules back from interstitial fluid to circulation.</li> <li>• It helps in transport of lymphocytes, RBCs, antigens and antigen presenting cells to the secondary lymphoid organs.</li> <li>• The digested fats in small intestines are absorbed into the lymph vessels and carried to the liver and the circulation.</li> <li>• It supplies oxygen and nutrients to selected parts of the body.</li> </ul>	<p>Teacher</p> <p>Enumerates Lymph and its composition with the help of chalk board and PPT.</p> <p>Student listens attentively and takes notes.</p>	Enlist functions of lymph and lymphatic system?

### **SUMMARY AND EVALATION (10 MIN.):**

Today we discussed in this lesson plan about different functions of lymph vessels, as we already know that lymph system contribute in maintain our immunity as well fat absorption from small intestines. It has its significant importance in our body.

### **EVALUATION:**

- What is immune system?
- What is the function of immune system?

### **ASSIGNMENT:** -

Define immune system; enlist various functions of immune system?

### **BIBLIOGRAPHY:**

1. ASHALATHA P R., DEEPA G, “textbook of anatomy and physiology for nurses”, jaypee publication, 4<sup>th</sup> edition, 2015, p.n. 99-104.
2. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness”, Churchill living stone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 131-138
3. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n. 671-680

## LESSON PLAN

**SUBJECT** : Anatomy and Physiology

**UNIT** : Lymphatic System

**TOPIC** : **Lymph Circulation**

**GROUP** : G.N.M. 1<sup>ST</sup> Year student

**PLACE** : Class Room and Demonstration Room

**DATE AND TIME** : 50 Minutes

**TEACHING METHOD** : Lecture cum Discussion

**AV AIDS / INSTRUCTIONAL AIDS:** Blackboard and chalk, chart, PPT

**STUDENT'S PRE REQUISITES** : Students can explain the lymph, lymph organs lymph nodes.

**GENERAL OBJECTIVES** : At the end of the class students will be able to explain the lymph circulation and role of cistern chyli, thoracic duct and right thoracic duct.

**SPECIFIC OBJECTIVES** : At the end of the class the students will be able to

1. Explain the circulation of lymph.
2. Different organs involved in lymph circulation.

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
1.	10 min.	Introduction	<p>Lymphatic system is a closed system of vessels which draws the extra tissue fluid into the blood vascular system</p> <p><b>Lymph and lymph vessels</b></p> <ul style="list-style-type: none"> <li>• Lymph</li> <li>• Lymph capillaries</li> <li>• Lymph vessels proper</li> <li>• Terminal lymph ducts</li> </ul> <p><b>Lymphoid tissue</b></p> <ul style="list-style-type: none"> <li>• <b>Lymph nodes</b></li> <li>• <b>Spleen</b></li> <li>• <b>Tonsils</b></li> <li>• <b>Thymus</b></li> <li>• <b>Bone marrow</b></li> </ul>	<p>T:- discuss with help of black board and chart</p> <p>S:- listen and take down notes</p>	What is lymphatic system?
2.	15 min.	Lymph and its composition	<ul style="list-style-type: none"> <li>• the tissue fluid which enters the lymphatic system is known as lymph.</li> <li>• Lymph carries particulate material, colloids and macromolecules from tissue fluid.</li> <li>• This maintain the low protein concentration of tissue fluid.</li> </ul>	<p>T:- explain with help of ppt and chart</p> <p>S:- listen and take down notes</p>	What is lymph?

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
			<ul style="list-style-type: none"> <li>Lymphocytes are the most abundant component of the lymph.</li> <li>Usually , lymph is a clear and colorless fluid.</li> <li>It is formed by 96% water and 4% solids.</li> </ul>		
3.	25 min.	Lymph circulation	<ul style="list-style-type: none"> <li>As many as four or five afferent lymph vessels may enter a lymph vessels may enter a lymph node while only one efferent vessel carries lymph away from the node.</li> <li>Lymph from the head and neck passes through deep and superficial cervical nodes .</li> <li>Lymph from the upper limbs passes through nodes situated in the elbow region then through the deep superficially axillary nodes.</li> <li>Lymph from organs and tissues in the thoracic cavity drains through groups of nodes , including parasternal, intercostals, brachiocephalic, mediastinal, tracheobronchial, bronchopulmonary and oesophageal nodes.</li> <li>Most of the lymph from the breast passes through the</li> </ul>	<p>T:- discuss with help of ppt</p> <p>S:- listen and take down notes</p>	<p>1.What is cistern chyli?</p> <p>2. Tell groups of nodes in thoracic cavity.</p>

S.NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
			<p>axillary nodes.</p> <ul style="list-style-type: none"> <li>• Lymph from the pelvic and the abdominal cavities passes through many lymph nodes before entering the cistern chyli.</li> <li>• The abdominal and pelvic nodes are situated mainly in association with the blood vessels supplying the organs and close to the main arteries, i.e., the aorta ,and the external and the internal iliac arteries.</li> <li>• The lymph from the lower limbs drains through deep and superficial nodes including popliteal nodes and inguinal nodes.</li> <li>• The lacteals are the lymph capillaries which drain lymph from the small intestine. Fat absorbed from the small intestine passes into the lymph capillaries and gives the lymph a milky appearance. Because of this, lymph entering the thoracic duct from the small intestine called chyle.</li> </ul>		

**Summary: In this lesson plan we discussed –**

- 1) Lymphatic system
- 2) Lymphatic organs
- 3) Lymph composition
- 4) Lymph nodes
- 5) Lymph circulation in different sites.

**Assignment :**

1. Explain lacteals. Why the lymph in lacteals is milky in its appearance?
2. Explain lymph circulation in thoracic cavity.

**Bibliography:**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n . 136-137
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 671-675
- Wilson j.w. Kathleen, ross and Wilson anatomy and physiology in health and illness, 7<sup>th</sup>edn., 1992, pgs 102-104.

## LESSON PLAN

**SUBJECT** : Anatomy and Physiology

**UNIT** : V (The lymphatic tissue)

**TOPIC** : **SPLEEN**

**GROUP** : GNM 1<sup>st</sup> year

**PLACE** : Class room

**DATE& TIME** : 60 minute

**TEACHING METHOD:** Lecture cum discussion

**A V AIDS:** Black Board And Chalk, Poster, PPT

**Students Pre requisite:** The students should be able to understand the key elements of immune response.

**General objective:** At the end of the class student will be able to gain knowledge about anatomy and physiology of spleen.

**Specific objectives:** At the end of the class the students will be able to

1. Introduce about spleen
2. Enumerate various dimensions and external features of spleen.
3. Tell about various functions of spleen.

**Review of previous class:** Ask questions regarding the previous knowledge about various tissues.



S No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
1	5min	To introduce about spleen	<b>SPLEEN</b> Spleen is the largest single mass of lymphoid tissue in the body. It is composed of reticular and lymphatic tissues. It is Red brown in colour, soft and friable. Normally, it is a blood-forming organ in fetal life and blood destroying organ in postnatal life (graveyard of RBCS).	Lecture cum Discussion	Q:What do you mean by spleen?
2	5min	To explain about its location	<b>LOCATION</b> The spleen lie in the left hypochondriac region of the abdominal cavity between the fundus of the stomach and diaphragm at the level of 9 <sup>th</sup> , 10 <sup>th</sup> and 11 <sup>th</sup> ribs. Its long axis is parallel to the 10 <sup>th</sup> rib.	T:write down on black board S:watch and note down	Q: where does spleen locate?
3	3 min	To learn about the organs associated with spleen.	<b>ORGANS ASSOCIATED WITH THE SPLEEN</b> Superiorly & posteriorly- diaphragm Inferiorly – left colic flexure of large intestine Anteriorly- fundus of the stomach Medially- pancreas and the left kidney Laterally- separated from 9 <sup>th</sup> to 11 <sup>th</sup> ribs and respective intercostals muscles by diaphragm.		

S No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
4	10min	To explain about its dimension	<b>DIMENSIONS</b> It is a wedge-shaped organ. It is about 1 inch thick, 3 inches broad, 5 inches long, 7 ounces in weight and is related to 9 <sup>th</sup> to 11 <sup>th</sup> ribs.	T:explain with Poster S:observe and Take notes	Q: what are the dimensions of spleen?

S No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
5	10min	To discuss about external feature	<p><b>EXTERNAL FEATURES</b></p> <p>The spleen has two ends, three borders and two surfaces. The spleen is slightly oval in shape with its hilum in anterior surface. Anterior surface is covered with peritoneum. The spleen is covered by a fibroelastic capsule that dips into the spleen to form <i>trabeculae</i>.</p> <p><u>The cells</u>, the cellular material consist of lymphocytes and macrophages which is called <i>splenic pulp</i> lying in the trabeculae.</p> <ul style="list-style-type: none"> <li>➤ Anterior: It is expanded</li> <li>➤ Posterior: It is rounded and is directed backward &amp; medially</li> <li>➤ Inferior: it is rounded</li> <li>➤ Superior: It is notched &amp; indicates lobulated origin of spleen</li> <li>➤ Intermediate : It is rounded and directed to the right</li> <li>➤ The outer diaphragmatic surface is convex and smooth</li> <li>➤ Visceral surface: It is irregular and is related to important organs which form an impression on visceral surface <ul style="list-style-type: none"> <li>• Gastric impression-Fundus of stomach</li> <li>• Renal impression – left kidney</li> <li>• Colic impression- splenic flexure of colon</li> <li>• Pancreatic impression- tail of pancreas</li> </ul> </li> <li>➤ Hilum: It is a cleft present along the long axis of spleen Which transmit splenic vessels and nerve.</li> </ul>	T: explain with PPT S: observe and take notes	Q: enlist the various organs which directly attach to spleen?

S No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
6	5 min	To learn about microscopic structure of spleen.	<p>The spleen is covered by a fibroelastic capsule that dips into the spleen to form <b>trabeculae</b>.</p> <p><u>The cells</u>, the cellular material consist of lymphocytes and macrophages which is called <b>splenic pulp</b> lying in the trabeculae.</p> <p><b>Red pulp</b> is the part suffused with blood and <b>white pulp</b> consists of areas of lymphatic tissue where there are sleeves of lymphocytes and macrophages around blood vessels.</p>		
7	10min	To explain blood supply and venous drainage	<p><b>BLOOD SUPPLY</b></p> <p><b>ARTERIAL SUPPLY</b> Arterial supply is by the splenic artery branch of celiac artery.</p> <p><b>VENOUS DRAINAGE</b> The splenic vein emerge from the hilum of the spleen (a branch of portal vein).</p> <p><b>LYMPH VESSELS</b> Lymphatic vessels ( efferent only)</p>	T:explain with PPT S: observe and take notes	Q: tell about the arterial supply and venous drainage of spleen?
8	15min	To elaborate the various functions of spleen	<p><b>FUNCTIONS OF SPLEEN</b></p> <ol style="list-style-type: none"> <li>1. Immune response: Spleen is a centre where both B &amp; T lymphocytes multiply and it is the only site where an immune response can be started against antigens present in the blood.</li> <li>2. Destruction of RBCs: The spleen contain the largest</li> </ol>	Lecture cum discussion	Q: List out the main functions of spleen?

S No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<p>aggregation of macrophages of the mononuclear phagocyte system. It destroy the RBCs who have completed their life. Or abnormal.</p> <p>3. Production of blood cells: In fetal life the spleen is a centre for production of all blood cells, in later life only lymphocytes are produced here. But in great need it can produce RBCs’.</p>		

### **SUMMARY& EVALUATION(10MIN)**

- The spleen as important organ of lymphatic system.
- Let the students verbalise about spleen its location, dimensions etc
- Read out its external feature, its blood supply and its main functions once again

**ASSIGNMENT:** What is spleen, where does it locate and describe its external features?

**EVALUATION:** Unit test for 50 marks once the unit is completed

### **BIBLIOGRAPHY:**

1. pr ashaltha, g deepa, "textbook of anatomy& physiology for nurses", jaypee brother, 4<sup>th</sup> edition, 2015, page 108-110.
2. waugh Anne, Allison grant "ross & Wilson anatomy and physiology in health and illness", Elsevier Churchill livingstone, 7<sup>th</sup> edition 1998, 137-138.

## LESSON PLAN

<b>SUBJECT</b>	: Anatomy and Physiology
<b>UNIT</b>	: V (Lymphatic System)
<b>TOPIC</b>	: <b>Lymphatic Tissue- Thymus</b>
<b>GROUP</b>	: G.N.M. 1 <sup>ST</sup> Year Student
<b>PLACE</b>	: Class Room and Demonstration Room
<b>DATE AND TIME</b>	: 60 MINUTES
<b>TEACHING METHOD</b>	: Lecture cum Demonstration
<b>AV AIDS / INSTRUCTIONAL AIDS</b>	: BLACKBOARD AND CHALK, CHART, PPT
<b>STUDENT'S PRE REQUISITES</b>	: Students Can Explain The Differences Between The Lymph And The Blood, The Composition Of The Lymph, Functions Of Lymphatic System, And Lymph Circulation
<b>GENERAL OBJECTIVES</b>	: At the End of the Class Students Will Be Able To Explain Structure Of Thymus Its Functions
<b>SPECIFIC OBJECTIVES</b>	: At the End Of The Class The Students Will Be Able To <ol style="list-style-type: none"><li>1. To Introduction- lymphatic tissue.</li><li>2. To learn about Location and position – thymus gland.</li><li>3. To explain about thymocytes.</li><li>4. To learn about structure of thymus gland.</li><li>5. To explain the functions of thymus.</li></ol>

S. NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
1.	10 min	Introduction-lymphatic tissue	<b>Lymphoid tissue</b> <ul style="list-style-type: none"> <li>❖ The lymphoid tissues are the part of tissue macrophage system, also known as reticulo-endothelial system.</li> <li>❖ Lymphoid tissues play an important role in immunological surveillance.</li> <li>❖ These are formed by aggregation of lymphocytes, macrophages, plasma cells and dendritic cells arranged on a background framework of reticular fibres.</li> <li>❖ They help to destroy bacteria, foreign bodies, old RBCs and WBCs.</li> <li>❖ The lymphoid tissue can be primary or secondary.</li> <li>❖ Primary lymphoid organs- generate new lymphocytes from stem cells. Ex- bone marrow and thymus</li> <li>❖ Secondary lymphoid organs- contain mature B and T lymphocytes and hence help in initiating immunological response. Ex- lymph nodes, spleen, Palatine tonsils and peyer's patches.</li> </ul>	Lecture cum discussion	What are the lymphatic organs?



S. NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
2.	10 min	Location and position – thymus	<b>LOCATION &amp; POSITION OF THYMUS</b> <ul style="list-style-type: none"> <li>• Bi-lobed, roughly pyramidal mass of lymphoid tissue.</li> <li>• Situated in the superior mediastinum.</li> <li>• It may extend into the anterior mediastinum and also in the root of the neck.</li> <li>• At birth the thymus is relatively small, its size increases gradually, till puberty. Then it atrophies gradually, getting infiltrated by fatty and fibrous tissue.</li> <li>• The thymus is situated behind the manubrium sterni, and anterior to the aortic arch and its branches .</li> <li>• At birth outweighs about 10grams and it increase in size till puberty when it's weight is about 30-40 grams. Then it slowly atrophies. At middle age it return to approximate weight of birth.</li> </ul>	T: explain with charts, posters S: observe and take notes	Q:What do you about location of thymus?

S. NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
3	5 min	To learn about structure of thymus gland.	<b>INTERNAL STRUCTURE OF THYMUS GLAND –</b> The thymus gland consist of two lobes which are joined to each other by areolar tissue. The lobes are enclosed in a fibrous capsules which dips into the substance to divide the lobes in lobules. These lobules consist of epithelial cells and lymphocytes.		

S. NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
4	10 min	To explain about thymocytes	<b>LYMPHOCYTES OF THYMUS (THYMOCYTES)</b> <ul style="list-style-type: none"> <li>• The cortex in each lobule of the thymus is densely packed with lymphocytes.</li> <li>• The stem cells formed in the bone marrow travel to the thymus, they come to lie in the superficial part of the cortex.</li> <li>• They divide repeatedly and small lymphocytes are formed which move to the deeper layers of cortex and finally reach the medulla, ultimately they leave the thymus by passing into blood vessels and lymphatics.</li> </ul>	T: explain with slides S: observe and take notes	Q: What do you mean by thymocytes?

S. NO.	TIME	SPECIFIC OBJECTIVE	CONTENT	TEACHING LEARNING ACT.	EVALUATION
5	10 min	To explain the functions of thymus.	<b>FUNCTIONS OF THYMUS</b> <ol style="list-style-type: none"> <li>1. The lymphocytes originating from stem cells of bone marrow enter into the thymus to develop into the T- lymphocytes.</li> <li>2. The thymic processing ( in the thymus gland ) produces mature T- lymphocytes. These can distinguish “self” from foreign and also the ability to react with one Ag out of millions Ag encountered by the T- cell.</li> <li>3. These lymphocytes are thrown into the circulation. Some enter into the circulation and some into the lymph nodes and spleen.</li> <li>4. Thymus produces a number of hormones like thymulin, thymoprotein, and thymosin.</li> </ol>	Lecture cum discussion	Q: What are the functions of thymus gland?

## **SUMMARY & EVALUATION (10 MIN)**

- 1 .Characters of lymphatic tissues
2. let the students to verbalise about location and position of thymus gland
- 3 Repeat functions of thymus

**ASSIGNMENT:** Draw a labelled diagram of thymus gland. Describe thymus as important part of lymphatic system in detail.

**EVALUATION:** A test of 50 marks would be taken at the end of topic

## **Bibliography-**

1. p r Ashalatha, deepa g, “textbook of anatomy and physiology for nurses”, 4<sup>th</sup> edition 2015, jaypee publication, pgs 111-112.
2. Wagh anne and Grant Allison, “ ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill livingstone Elsevier, pp 138-139.

## LESSON PLAN

Subject : Anatomy & physiology

Unit : 6

Topic : **Structure of Respiratory System**

Group : G.N.M. Ist Year

Place : Class Room

Date & time : 60minute

Teaching method : Lecture cum Discussion

A V aids/instruction aids : Black board, chalk, chart, LCD, Computer

**General Objective** : At the end of class the student will be able to gain knowledge regarding structure of respiratory system

**Specific Objective** : At the end of class student will be able to

1. explain structure of nasal cavity
2. discuss pharynx.
3. describe structure of larynx
4. explain about trachea
5. discuss about bronchioles & alveoli
6. describe lungs
7. explain about muscle of breathing & the diaphragm

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min.	To explain structure of nose and nasal cavity	<b>Nose and Nasal cavity:</b> <ol style="list-style-type: none"> <li>1. The roof</li> <li>2. The floor</li> <li>3. The medial wall</li> <li>4. The lateral wall</li> <li>5. The posterior wall <ul style="list-style-type: none"> <li>• Lining of the nose –ciliated columnar epithelium</li> <li>• opening into the nasal cavity</li> <li>• The anterior nares</li> <li>• The posterior nares</li> <li>• The paranasal sinuses</li> </ul> </li> </ol>	T-Explain with lecture S: listen and take notes	Q: ask about structure of nasal cavity.
2.	10 Min.	To discuss pharynx	<b>Pharynx:</b> <ul style="list-style-type: none"> <li>• The nasopharynx</li> <li>• The oropharynx</li> <li>• The laryngeopharynx</li> </ul> <p>It composed of three layers of tissue</p> <p>➤ mucous membrane lining</p>	T-Explain with lecture S: listen and take notes	Q: ask about part of pharynx.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
3.	05 min	To discuss structure of larynx	<ul style="list-style-type: none"> <li>➤ fibrous tissue</li> <li>➤ smooth muscle</li> </ul> <p><b>Larynx :</b></p> <p><b>1. cartilages</b></p> <ul style="list-style-type: none"> <li>➤ The thyroid cartilage</li> <li>➤ Iercoïd cartilage</li> <li>➤ The arytonoid cartilage</li> <li>➤ The epiglottis</li> </ul>	T-Explain with lecture S: listen and take notes	Q: ask about structure of larynx.
4.	05 min.	To explain about trachea	<p><b><u>Interior of the larynx :</u></b></p> <p><b>Vocal cords :</b></p> <p><b><u>Trachea :</u></b></p> <p>The outer fibrous &amp; elastic tissue layers.</p> <ul style="list-style-type: none"> <li>➤ Middle cartilage &amp; smooth muscle layer.</li> <li>➤ The inner ciliated columnar epithelium layers</li> </ul>	T-Explain with lecture S: listen and take notes	Q: ask about structure of trachea.



S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
5.	10 min.	To discuss about bronchioles & alveoli	<b><u>Bronchiols &amp; alveoli :</u></b> <ul style="list-style-type: none"> <li>➤ right bronchiols &amp; Left bronchiols</li> </ul> <b>Alveoli:</b> air such, 150million alveoli in adult lung with process of gas exchange of occurs.	T-Explain with lecture S: listen and take notes	Q: ask about structure of bronchiols.
6	10 Min.	To describe lung	<b>Lungs:</b> <ul style="list-style-type: none"> <li>➤ The apex</li> <li>➤ The base</li> <li>➤ The costal surface</li> <li>➤ The midial surface</li> </ul>		
7.	10 Min.	To explain muscle of breathing & the diaphragm	<b>Pleura &amp; pleural cavity</b> <ul style="list-style-type: none"> <li>➤ The visral pleura.</li> <li>➤ The parital pleura.</li> </ul> <b>Interior of lungs:</b> <ul style="list-style-type: none"> <li>➤ Bronchia</li> <li>➤ alveoli</li> <li>➤ connective tissue</li> <li>➤ blood vessels</li> </ul>	T-Explain with lecture S: listen and take notes	Q: ask about part of lung.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<ul style="list-style-type: none"> <li>➤ lymph vessels</li> <li>➤ nerves</li> </ul> <p><b>Muscle of breathing:</b></p> <ol style="list-style-type: none"> <li>1. Intercostal muscle <ul style="list-style-type: none"> <li>➤ 11 pairs</li> </ul> </li> </ol> <p><b>Diaphragm:</b></p> <p>Separate – thoracic &amp; abdominal cavity</p>	<p>T-Explain with lecture</p> <p>S: listen and take notes</p>	<p>Q: ask about muscle of breathing</p>

**Summary:**

1. Ask structure of nasal cavity
2. what is pharynx
3. List cartilage of larynx

**Assessment:** Draw a neat & labelled diagram of respiratory organs in note book.

**Evolution :** Class test after completions of Topic

**Bibliography:**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n . 242- 257
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 707-740

## LESSON PLAN

Subject	: BIO SCIENCE (Anatomy & physiology)
Unit	: 6 Respiratory system
Topic	: <b>Function of respiratory system (topic no.259)</b>
Group	: G.N.M. Ist Year
Place	: Class Room & Demonstration Room
Date & time	: 60minute
Teaching method	: Lecture cum Discussion
A V aids/instruction aids	: Black board, chalk, chart ,LCD ,Computer
General Objective	: At the end of class the student will be able to gain knowledge about function of respiratory system
Specific Objective	: After end of class student will be able <ol style="list-style-type: none"><li>1. To explain function of the nose .</li><li>2. To explain function of the pharynx.</li><li>3. To explain function of the larynx</li><li>4. To explain function of the trachea</li><li>5. To explain function of the lungs</li></ol>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	10 min.	To explain function of nose	<b>Nose function:</b> <ol style="list-style-type: none"> <li>1. warming</li> <li>2. filtering and cleaning</li> <li>3. humidification</li> <li>4. olfactory function or sense of smell</li> </ol>	T-describe with chart and ppt S: listen and take notes	Q: ask about function of nose?
2.	10 min	To enlist of the pharynx	<b>Function of the pharynx:</b> <ol style="list-style-type: none"> <li>1. passage way for air and food</li> <li>2. warning and humidification</li> <li>3. Taste.</li> <li>4. hearing.</li> <li>5. protection.</li> <li>6. speech.</li> </ol>	T-Explain black board S: listen and take notes	Q: ask about function of pharynx?
3	10 min	To describe function of the larynx	<b>Function of the larynx:</b> <ol style="list-style-type: none"> <li>1. production of sound.</li> <li>2. speech</li> <li>3. protection of the lower respiratory Tract</li> </ol>	T-Explain with ppt, black board S: listen and	Q: ask about function of larynx?

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
4	10 min	To discuss function of the trachea	<p>4. passage way for air</p> <p>5. humidifying, filtering and warming</p> <p><b>Functions of the trachea:</b></p> <ol style="list-style-type: none"> <li>1.support and patency.</li> <li>2. mucociliary escalator.</li> <li>3. cough reflex.</li> <li>4. warming humidifying and filtering.</li> </ol>	<p>take notes</p> <p>T- enumerate with lecture</p> <p>S: listen and take notes</p>	Q: ask about function of trachea.
5	10 min	To explain function of the lungs	<p><b>Function of the lungs:-</b></p> <p><b>a. pleura and pleural cavity:-</b></p> <ul style="list-style-type: none"> <li>- it consist pleural fluid, prevents friction.</li> <li>- It helps in keeping lungs inflated.</li> </ul> <p><b>b. bronchi and bronchiole:-</b></p> <ul style="list-style-type: none"> <li>- control of air entry:- regulate the speed and volume of airflow</li> <li>- warming and humidifying</li> <li>- support and patency</li> </ul>	<p>T-discuss with ppt chart</p> <p>S: listen and take notes</p>	Q: ask about function of lung.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<ul style="list-style-type: none"> <li>- removal of particulate matter</li> <li>- cough reflex</li> </ul> <p><b>b. respiratory bronchiole and alveoli:-</b></p> <ul style="list-style-type: none"> <li>- external respiration</li> <li>- defence against infection</li> <li>- warming and humidifying</li> <li>- breathing or pulmonary ventilation:- movement of air into and out of the lungs</li> <li>- exchange of gases:- internal and external respiration.</li> </ul>		

**Summary:**

In this chapter we have discussed about the functions of respiratory system. It is a vital system consist various part. It get the oxygen from environment and excrete the carbon di oxide out from the body. Each and every part of this system plays an important role in this work. The major function is to filter the air, humidify and warm the air, gas exchange and breathing activity.

**Assignment:**

List various function of respiratory system.

**Evaluation:**

class test after complete of topic

**Bibliography:**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n 242-259
- Tortora Gerard J., Grabowski S.R. , “ Principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 707-744



## LESSON PLAN

SUBJECT	: Anatomy & Physiology
UNIT	: VI
TOPIC	: <b>The Physiology of Respiration (Topic No 260)</b>
GROUP	: G.N.M. I Year
PLACE	: Class Room & Demonstration Room
DATE & TIME	: 60 Minute
TEACHING METHOD	: Lecture cum Discussion
A V AIDS	: Blackboard& Chalk, Chart, PPT
STUDENTS PRE-REQUISIT:	Students should be able to describe the anatomy of respiratory tract.
GENERAL OBJECTIVE	: At the end of class student will be able to gain knowledge about the physiology of respiration.
SPECIFIC OBJECTIVES	:At the end of class student will be able :- <ol style="list-style-type: none"><li>1. To define the term ventilation.</li><li>2. To List Phases of respiration</li><li>3. To define inspiration.</li><li>4. To define expiration</li><li>5. To discuss the mechanism of respiration or ventilation.</li><li>6. To explain factor affecting breathing.</li><li>7. To describe exchange of gas</li><li>8. To learn the transport of gases in blood.</li><li>9. The discuss control of respiration.</li></ol>

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1	3min	To define the term ventilation.	<b>Ventilation-</b> during inspiration, chest wall expands-----intrapulmonary pressure falls, air from the atmosphere enters into the lung. This is inspiration. During expiration, chest wall and lungs shrink-----intrapulmonary pressure rises----- air is forced to leave the lungs. Therefore the thoracic cage and lungs expand and shrink to cause inspiration and expiration- these two are called ventilation.	<b>T:</b> Explain with power point presentation. <b>S:</b> Listen and takes notes	<b>Q:</b> what do you mean by ventilation?
2	02mins	To List Phases of respiration	<b>Phases of respiration:</b> The ventilation or respiration comprises of following phases  1. INSPIRATION 2. EXPIRATION 3. PAUSE	<b>T:</b> Explain with power point presentation.  <b>S:</b> Listen and takes notes	<b>Q:</b> ask about Explain Phases of respiration

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3	2mins	To define inspiration.	<b><u>Discuss inspiration:</u></b> <ul style="list-style-type: none"> <li>✓ Decrease pressure in pleural cavity then atmospheric pressure causing air into lungs.</li> <li>✓ It is active process, it need energy for muscle contraction.</li> <li>✓</li> </ul>	<b>T:</b> Explain with power point presentation. <b>S:</b> Listen and takes notes	<b>Q:</b> ask about inspiration
4	2 mins	To define expiration	<b><u>Discuss expiration:</u></b> <ul style="list-style-type: none"> <li>✓ Pressure inside the lungs exceeds, that in the atmosphere and so air is expelled from the respiratory tract.</li> </ul>	<b>T:</b> Explain with power point presentation. <b>S:</b> Listen and takes notes	<b>Q:</b> ask about expiration
5	10 min	To discuss the mechanism of respiration or ventilation.	<b><u>Mechanism of ventilation :</u></b> There are some muscles, called muscles of inspiration (diaphragm, and the external intercostals muscles) which when contract, cause expansion of the thoracic cage in every ( transverse- vertical- anterioposterior ) diameter.	<b>T:</b> Explain with power point presentation. <b>S:</b> Listen and takes notes	<b>Q:</b> briefly describe about ventilation.



S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>The pleural cavity of the lungs is ultimately attached with the inner sides of the chest wall. Therefore when the chest wall expands the parietal pleura also tries to move along the expanding chest wall.</p> <p style="text-align: center;">↓</p> <p>The visceral pleura is strongly attached with the lung surface. Between the visceral and parietal pleura, there is a thin layer of fluid which do not allow two surface to detach easily. Hence during chest expansion, visceral pleura also moves and tries to drag the lungs.</p> <p style="text-align: center;">↓</p> <p>The elastic lungs expands along the chest wall movement.</p> <p style="text-align: center;">↓</p> <p>This expansion of lungs causes</p>		

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>dilatation of the airway tube and the alveolisystem. So the intrapulmonary pressure falls.</p> <p style="text-align: center;">↓</p> <p>Airway tube is in direct communication with the external atmosphere. Therefore when the intrapulmonary pressure falls, a pressure gradient develop. The air enters from the external atmosphere into to lungs. This inflow of air continues until intra pulmonary pressure become equal to the external atmospheric pressure. This is <b>inspiration</b>.</p> <p style="text-align: center;">↓</p> <p>Now the muscles of inspiration stop contracting. So the elastic recoil of lungs acts almost unopposed. The lungs shrinks causing intrapulmonary</p>		

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>pressure to rise. Air leave the lungs till the intrapulmonary pressure become equal to external atmospheric pressure. This is called <b>expiration</b>.</p> <ul style="list-style-type: none"> <li>• Inspiration is a active process while expiration is passive process but forced expiration in active process.</li> </ul>		
6	3 mins	To explain factor affecting breathing.	<p><b><u>To explain factor affecting breathing:</u></b></p> <ul style="list-style-type: none"> <li>❖ Elasticity</li> <li>❖ Compliance</li> <li>❖ airway resistance</li> </ul>	T: Explain with power point presentation. S: Listen and takes notes	Q: ask about factor affecting breathing
7	5 mins	To describe exchange of gases.	<p><b>To describe exchange of gas:</b> <b>Diffusion of gase :-</b></p> <ul style="list-style-type: none"> <li>• Diffusion of gases occurs when a difference in partial pressure exists</li> </ul>	T: Explain with power point presentation. S: Listen and	Q: Discuss exchange of gases.

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>across a semipermeable membrane occur.</p> <ul style="list-style-type: none"> <li>Gases move by diffusion from the higher concentration to the lower until equilibrium is established. These principles govern the diffusion of gases.</li> </ul> <p><b>External respiration:</b> Exchange of gases by diffusion between the alveoli and the blood in the alveolar capillaries across the respiratory membrane.</p> <p>Each alveolar wall is one cell thick and is surrounded by a network of tiny capillaries. The total area for exchange of gases in alveoli is equivalent to tennis court.</p> <p>Venous blood arriving at the lungs in pulmonary has travelled from all tissue of the body, and contain high level of carbon dioxide and low level of oxygen. Carbon dioxide diffuse from venous blood down its concentration gradient into the alveoli until equilibrium is reached. By the same process, oxygen diffuse from alveoli into the blood.</p>	takes notes	

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>Relatively slow flow in capillaries allow time for gas exchange to occur.</p> <p><b>Internal respiration:</b> Exchange of gases by diffusion between blood in the capillaries and body cell.</p>		
8	10 min	To learn the transport of gases in blood.	<p><b>Transport of gases in the blood stream :</b> Oxygen and carbon dioxide are carried in the blood in different ways.</p> <p><b>Oxygen:-</b> Oxygen is the carried in the blood in chemical combination with haemoglobin as oxyhaemoglobin and in solution in plasma water.</p> <p>Oxyhaemoglobin is unstable, and under certain conditions readily dissociates releasing oxygen. Factors that increase dissociation include oxygen level, low pH , and raised temperature. Oxyhaemoglobin is bright red, and deoxygenated blood s bluish purple in colour.</p>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	<p>Q: how the oxygen and carbon dioxide is transported in blood?</p>



S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p><b>Carbon- dioxide(CO<sub>2</sub>):-</b>  It is excreted by the lungs and is transported by three mechanisms :</p> <ul style="list-style-type: none"> <li>➤ As bicarbonate ions in the plasma (70%) .</li> <li>➤ Some is carried in combination with haemoglobin as Carbaminohaemoglobin.(23%)</li> <li>➤ Dissolved in the plasma.(7%)</li> </ul> <p>Carbon dioxide level should be fairly managed. Because excess or deficient levels leads to disruption in acid- base balance. Sufficient level cause bicarbonate buffer system to work effectively. Excess carbon dioxide reduces blood pH.</p>		
9	10 mins	The discuss control of respiration.	<p><b>Control of respiration:</b>  Effective control of respiration enable the body to regulate blood gas levels over a wide range of physiological , environmental, and pathological conditions. The control is usually involuntary. Voluntary control is exerted during speaking and singing.</p>	<p>T: Explain with power point presentation.  S: Listen and takes notes</p>	<p>Q: ask about control of respiration</p>

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>• <u>The respiration centre:-</u> A groups of nerves in the brain stem, which control respiration. (1) main part of respiratory centre is in medulla called medullary respiratory centre, (2) other part in pons called pneumotaxis centre.</li> <li>• When RC fires, inspiration occur. When it stop fire – inspiration stop.</li> </ul> <p>2- Chemoreceptor's:- these are he receptors that respond to changes in the partial pressure of oxygen and carbon dioxide in blood and cerebrospinal fluid, these are located centrally and peripherally.</p> <ul style="list-style-type: none"> <li>• Central receptors are located in medulla oblongata and are bathed in CSF. When arterial <math>pCO_2</math> rises the central chemoreceptors respond by stimulating the respiratory center.( reduction in arterial <math>pO_2</math> has same effectbut less pronounced.</li> <li>• Peripheral chemorecetors: these are located in arch of aorta and in carotid bodies. They respond to <math>O_2</math> and <math>CO_2</math></li> </ul>		

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>levels. These receptors also help to maintain BP.</p> <p><u>3- Other factor:-</u></p> <ul style="list-style-type: none"> <li>(a) Speech, singing</li> <li>(b) Emotional condition.</li> <li>(c) Drugs.</li> <li>(d) Sleep.</li> <li>(e) body temperature.</li> </ul>		

**Summary: (10 min)**

1. At the end of class summaries the topic as – ventilation comprises of two phases i.e. inspiration and expiration followed by a pause. Inspiration is active process and expiration is passive process but forced expiration is active process. The exchange of gases at alveoli and at capillary level occur due to pressure gradient and diffusion.

**Assignment:**

Describe the process of ventilation in detail.

Describe the mechanism of control of respiration.

**Evaluation:** At the end of unit 7, a test of 50 marks consisting of all type of questions.

**Bibliography:**

Waggoner and Grant Allison, “Ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill Livingstone Elsevier, pp 256-260.

Choudhary Sujit K, “Concise medical physiology” 4<sup>th</sup> edition 2002, New Central Book Agency (P) Ltd, pp- 120-130.

## LESSON PLAN

**SUBJECT** : Anatomy & Physiology  
**UNIT** : VI  
**TOPIC** : **Characteristics of Normal Respiration (Topic No. 261)**  
**GROUP** : G.N.M. I YEAR  
**PLACE** : Class Room & Demonstration Room  
**DATE & TIME** : 60 MINUTE  
**TEACHING METHOD** : Lecture cum Discussion  
**A V AIDS** : Blackboard & Chalk, Chart, PPT.  
**STUDENTS PRE-REQUISIT:** Students Should Be Able To Describe The Anatomy Of Respiratory Tract.  
**GENERAL OBJECTIVE** : At the end of class student will be able to gain knowledge about characteristics of normal respiration.

**SPECIFIC OBJECTIVES** : AT The End Of Class Student Will Be Able To:-

1. To Explain About Rate Of Respiration.
2. To Discuss About Depth Of Respiration.
3. To Discuss About Rhythm.

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1	5 min	To describe the characteristics of respiration.	<p><b>Introduction-</b> Respiration is the act of breathing. It is the process of taking in oxygen and giving out carbon dioxide. The exchange of gases between blood and air in lungs is called external respiration. The exchange of gases between blood and tissue at capillary level is called internal respiration.</p> <p>The normal respiration is effortless, automatic, regular, even and produces no noise. Is is called eupnoea.</p> <p><b>Normal characteristics of respiration are</b></p> <ol style="list-style-type: none"> <li>1. Rate,</li> <li>2. Depth,</li> <li>3. Rhythm,</li> <li>4. Easiness.</li> </ol>		
1	10 mins	To explain about rate of respiration	<p><b>Rate-of respiration:</b></p> <ul style="list-style-type: none"> <li>➤ No. Of full respiration in a minute .</li> <li>➤ Normal range 16-20 /minute in adult .</li> </ul> <p><b>Factor affecting respiration.-</b> Rate of respiration is affected by many factors like</p>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	Q: ask about rate of respiration

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation														
			<p>➤ Age- it varies with age i.e.</p> <table><tr><th>Age</th><th>Rate(per minute)</th></tr><tr><td>At birth</td><td>30-40</td></tr><tr><td>First yr</td><td>26-30</td></tr><tr><td>Second yr</td><td>20-26</td></tr><tr><td>Adolescence</td><td>20</td></tr><tr><td>Adults</td><td>16-20</td></tr><tr><td>Old age</td><td>10 -24</td></tr></table> <p>➤ Sex ➤ Emotions ➤ Change in the atmospheric pressure ➤ exercise ➤ changes in the external temperature ➤ Ingestion of food and digestion ➤ Disease condition</p>	Age	Rate(per minute)	At birth	30-40	First yr	26-30	Second yr	20-26	Adolescence	20	Adults	16-20	Old age	10 -24		
Age	Rate(per minute)																		
At birth	30-40																		
First yr	26-30																		
Second yr	20-26																		
Adolescence	20																		
Adults	16-20																		
Old age	10 -24																		
2.	15 min	To discuss about depth of respiration	<p><b>Depth of respiration:</b></p> <p>➤ Normal title volume is 500ml with each respiration.</p>	T: Explain with power point presentation.	Q: ask about depth of respiration														

S.No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ If more than this quantity of air passes in and out of the lungs, the respiration is said to be deep.</li> <li>➤ If the quantity of air is considerably less, the respiration is said to be shallow.</li> </ul>	S: Listen and takes notes	
3.	15min	To discuss about rhythm	<b>To discuss about rhythm</b> <ul style="list-style-type: none"> <li>➤ In a normal respiration, rhythm is normal.</li> <li>➤ Critically ill patient. And persons in nearing death are found to have irregular respiration.</li> </ul>	T: Explain with power point presentation. S: Listen and takes notes	Q: ask about rhythm



**SUMMARY: (10MIN)**

List out characterises of respiration.

**ASSIGNMENT:**

Write about characteristics of normal respiration.

**EVALUATION:**

Unit test for 50 marks once the unit is completed.

**BIBLIOGRAPHY:-**

Sister Nancy, “principles & practices of nursing” NR publishing house Indore, 6<sup>th</sup> edition2008 , page no. 319-322 .

## LESSON PLAN

**SUBJECT** : Anatomy & Physiology

**UNIT** : VI

**TOPIC** : **Characteristics of Normal Deviation**

**GROUP** : G.N.M. I YEAR

**PLACE** : Class Room & Demonstration Room

**DATE & TIME** : 30 MINUTE

**TEACHING METHOD** : Lecture cum Discussion

**A V AIDS** : Black Board&Chalk, Chart, PPT.

**STUDENTS PRE-REQUISITE** :The students should have knowledge related to characteristics of normal respiration.

**GENERAL OBJECTIVE** : At the End Of Class Student Will Be Able To Gain. Knowledge About Characteristics Of Normal Deviation Of Respiration.

**SPECIFIC OBJECTIVES:** At The End Of The Class, The Student Will Be Able To :-

1. To Describe Abnormal Deviations Of respiration

S. No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1	20 min.	To describe abnormal respiration	<b>ABNORMAL RESPIRATION :-</b> <ol style="list-style-type: none"> <li>1. TACHYPNOEA:- it is an increased respiratory rate over 24 breath per min.</li> <li>2. BRADYPNOEA:- it is a decreased respiratory rate less than 10 breath per min.</li> <li>3. APNOEA:- total cessation of breathing . it may be periodic or seen in chenyne- stroke respiration.</li> <li>4. HYPERNOEA:- it is an increase in the depth of respiration .</li> <li>5. ORTHOPNOEA:- the client can breathe only in an upright position .</li> <li>6. STERTOROUS RESPIRATION:- it is a noisy breathing . Snoring sound is produced as air pass through the secretions as seen in acute alcoholism.</li> <li>7. STRIDOR:- A harsh, vibrating, shrill sound is</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: ask about describe abnormal respiration.

S. No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>produced during respiration as seen in upper airway obstruction . E.g. in laryngitis, foreign body in URT.</p> <p>8. RALE (RAHL):- An abnormal rattling or bubbling sound caused by the mucus in the air passages as seen in the bronchitis or pneumonia .</p> <p>9. DYSPNOEA: - Difficult or laboured breathing .</p> <p>10. WHEEZE: - The high pitched musical whistling sound. That occur with partial obstruction of the smaller bronchi or bronchioles as seen in asthma , emphysema.</p> <p>11.SIGH: - Very deep inspiration followed by a prolonged expiration frequent sighs are signs of emotional tension.</p> <p>12.AIR HUNGER: a form of dyspnoea in which there is deep sighing respiration.</p>		

S. No.	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>13.CYNOSIS :- blueness or discolouration of the skin and mucus membrane caused by lack of oxygen in the tissues</p> <p>14.ANOXIA :- lack of oxygen in the tissues.</p> <p>15.ANOXAEMIA :- it is the lack of oxygen in the blood stream .</p> <p>16.ASPHYXIA ;- it is a state of suffocation . this is produced by prolonged interference with sufficient supply of oxygen.</p>		

**Summary:-**

At the end of the class summaries the topic as there may be changes in normal characteristics of respiration like in rate, rhythm, depth and easiness.

**Assignment:-** Write abnormal characteristics of respiration .

**Evaluation:-** Class Test after Completion of unit VI .

**Bibliography:-** Sister Nancy, “principles & practices of nursing” NR publishing house Indore, 6<sup>th</sup> edition 2008 , page no. 321 – 322 .

## **LESSON PLAN**

<b>Subject</b>	: Anatomy & physiology
<b>Unit</b>	: VII (the digestive system)
<b>Topic</b>	: <b>Structure of Alimentary tract (Topic no.263)</b>
<b>Group</b>	: G.N.M. 1 <sup>st</sup> Year
<b>Place</b>	: Class Room & Demonstration Room
<b>Date &amp; time</b>	: 45 minute
<b>Teaching method</b>	: Lecture cum Discussion

**STUDENTS PRE-REQUISITE:** The students should have knowledge related to various systems of body. And should have idea about alimentary canal.

**A V aids/instruction aids** : Black board&chalk, chart, PPT.

**General Objective** : At the end of class the student will be able to describe structure of alimentary tract.

**Specific Objective** at the end of the class, students will be able

1. To explain about position of alimentary canal.
2. To describes the organs of alimentary canal.
3. To explain about layers of alimentary canal.
4. To describes about serosa, muscular layer, sub mucosa, mucosa.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min	To introduce about alimentary canal.	<p><b>Introduction:</b> Digestive system include the alimentary canal, its accessory organs and a verity of digestive process that prepare food eaten in diet for absorption.</p> <p>The alimentary canal begins at mouth passes through thoracic, abdominal cavity and anus and ends at anal opening.</p>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	Q: Ask about position of GI.
2.	10 min	To describe about parts of alimentary canal.	<p><b>THE PARTS OF DIGESTIVE SYSTEM</b></p> <p><b>A.Parts of alimentary canal:</b></p> <ol style="list-style-type: none"> <li>1. Mouth</li> <li>2. Pharynx</li> <li>3. Oesophagus</li> <li>4. Stomach</li> <li>5. Small intestine</li> <li>6. Large intestine</li> </ol>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	Q. list the parts of digestive system?



S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			7. Rectum and anal canal  <b>B. Accessory organ:</b> <ol style="list-style-type: none"> <li>1. Three pair of salivary glands</li> <li>2. The pancreas</li> <li>3. Liver and biliary tract</li> </ol>		
3.	5 min	To describe the layers of alimentary canal	<b>Structure of alimentary tract:</b> The wall of alimentary tract formed by four layers of tissue. <ol style="list-style-type: none"> <li>1. Adventitia or serosa</li> <li>2. Muscle layer</li> <li>3. Sub mucosa</li> <li>4. Mucosa</li> </ol>	T: Explain with power point presentation.  S: Listen and takes notes	Q: list the layers of GIT   Q: explain about serosa, muscular, submucosa and mucus layer of alimentary canal
4.	10 min	To describes about serosa,	<b>Adventitia or serosa:</b> It is the largest serous membrane of body. It	T: Explain with power point	

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
		muscular layer, sub mucosa, mucosa.	<p>is the outer most layer of alimentary canal.</p> <p>In the thorax it consists of loose fibrous tissue and in the abdomen the organs are covered by a serious membrane called <b>PERITONEUM</b>.</p> <p>It has two layer:</p> <p>1 Parietal peritoneum: It covers the abdominal wall.</p> <p>2Visceral peritoneum: It covers the organ.</p> <p>These two layers are in close contact with each other and friction between these are prevented by presence of peritoneal fluid produced by peritoneal cells. ( same serous membrane are like pleura).</p> <p><b>Muscle layer:</b></p> <p>It consists of two layers of involuntary smooth muscle.</p>	<p>presentation.</p> <p>S: Listen and takes notes</p>	

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p><b>outer layer</b> -The muscle fibres of outer layer are arranged longitudinally.</p> <p><b>Inner layer</b> -Inner layer in circular form.</p> <p>Contractions in muscle layer produce peristalsis movement. Which push the content of alimentary canal onwards. Onward Movement of the muscle fibre is controlled by the <i>sphincters</i> _which is the thickened ring of the circular muscles.</p> <p>Between these two layers there are blood vessels, nerves( sympathetic and parasympathetic nerve plexus.</p> <p><b>Sub mucosa:</b></p> <p>This layer consists of loose areolar connective tissue containing collagen and some elastic fibres which binds muscle layer</p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>to mucosa. It contains blood vessels, venules, capillaries, nerve plexus etc.</p> <p><b>Mucosa:</b></p> <p>This consist of three layer of tissue:</p> <ol style="list-style-type: none"> <li>1. Mucus membrane of columnar epithelium</li> <li>2. Lamina propria of loose connective tissue</li> <li>3. Muscularis mucosa of thin outer layer of smooth muscles.</li> </ol>		

**Summary: (10 min)**

At the end of class summaries the topic as – digestive system is concerned with digestion of food. At the end of digestion the nutrients are broken in digestible form. The alimentary tract begins at mouth and passes through thoracic, abdominal pelvic cavity and end in anal opening. It is composed of a tube (passing through mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus), many accessory organs ( like salivary glands, pancreases, liver and biliary tract ) . the walls of the alimentary canal consist of four layers i.e. adventitia or serosa, muscle layer, sub-mucus layer and mucus layer etc.

**Assignment:** Draw a diagram of alimentary canal and the structure of alimentary canal. List the parts of alimentary canal. Describe the structure of alimentary canal.

**Evaluation:** At the end of unit 7, a test of 50 marks consisting of all type of questions.

**Bibliography:**

Wagh anne and Grant Allison, “ ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill livingston Elsevier, pp 286-289.

## LESSON PLAN

**Subject** : Anatomy & physiology  
**Unit** : 7  
**Topic** : **Function of alimentary tract (Topic no. 264)**  
**Group** : G.N.M. 1<sup>st</sup> Year  
**Place** : Class Room & Demonstration Room  
**Date & time** : 60 minute  
**Teaching method** : Lecture cum Discussion  
**A V aids/instruction aids** : Black board & chalk, chart, PPT

**STUDENT'S PRE REQUISITES:** students should be able to describe the structure alimentary canal, its parts and their composition.

**General Objective** : At the end of class the student will be able to describe the function of Parts of gastro-intestinal tract.

**Specific Objective** At the end of the class the students will be able to

1. To introduce about the topic.
2. To explain about function tongue.
3. To Describe the functions teeth.
4. To explain about functions of salivary gland.
5. To explain functions stomach.
6. To explain functions of small intestine.
7. To explain function large intestine, rectum, anal canal

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min	To introduce about the topic.	<p><b>Introduction:</b></p> <p>Alimentary tract or the gastro-intestinal tract is concerned with digestion of the food. The food we eat is in complex form, the nutrients present in the food are broken into simpler nutrients which can be absorbed into the circulation. This process of breaking food in simple form is called digestion.</p> <p>The process of digestion occur in Alimentary canal which begin from mouth. Alimentary canal is a long tube, its' different structure and parts of this have different function.</p>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	Q: ask about function of tongue.
2	5 min	To explain about function tongue.	<p><b>Function tongue :</b></p> <ol style="list-style-type: none"> <li>1. Chewing (mastication)</li> <li>2. Swallowing (deglutination)</li> <li>3. Speech</li> <li>4. Find out the taste of food.</li> </ol>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	Q: list the functions of tongue.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
3	5 min	To Describe the functions teeth.	<b>Teeth function:</b> Different Teeth Perform Different Functions. Premolars and molar teeth <ol style="list-style-type: none"> <li>1. Grinding of food</li> <li>2. Chewing of food</li> </ol> Incisors and canines <ol style="list-style-type: none"> <li>3. Biting &amp; Cutting of food</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	List the functions of teeth.
4	5 min	To explain about functions of salivary gland.	<b>Function of salivary gland:</b> <ol style="list-style-type: none"> <li>1. Chemical digestion of polysaccharides- saliva contains the enzyme amylase that break down complex sugar like starch into disaccharide.</li> <li>2. Lubrication of food.</li> <li>3. Cleaning and lubrication of mouth.</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about functions salivary gland.



S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
5	10 min	To explain functions stomach.	<p>4. Helps in find out the taste of food. 5. Lysozyme and immune-globulins kill the micro-organisms.</p> <p><b>Function of stomach:</b></p> <ol style="list-style-type: none"> <li>1. Temporary storage of food allowing time for the digestive enzyme, pepsin to work .</li> <li>2. Allow the time for enzymes action</li> <li>3. Pepsin break the protein into polypeptides.</li> <li>4. Mechanical breakdown – the three smooth muscles enable the stomach to act as the churn, gastric juice added, content are liquefied as chyme.</li> <li>5. Non specific defence against microbes- (Kill the micro organism by HCl.)</li> <li>6. Preparation of iron for absorption.</li> <li>7. Secretion of intrinsic factor for absorption of Vit-B12 in small intestine.</li> </ol>	<p>T: Explain with power point presentation. S: Listen and takes notes</p>	<p>Q: Ask about functions stomach</p>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
6	10 min	To explain functions of small intestine	<p>8. Secrete the hormone Gastrin. 9. Regulation of passage of gastric content into duodenum.</p> <p><b>Function of small intestine:</b></p> <ol style="list-style-type: none"> <li>1. Secretion of intestinal juice i.e. slightly alkaline and contain water, mucus, and mineral salts.</li> <li>2. Onward content of its content by the peristalsis.</li> <li>3. Completion of chemical digestion of carbohydrates, protein, and fat in the enterocytes.</li> <li>4. Protect by infection through lymph follicles.</li> <li>5. Secretion of hormone CCK (cholecystokinin and secretin).</li> <li>6. Absorption of nutrients.</li> </ol>	<p>T: Explain with power point presentation. S: Listen and takes notes</p>	<p>Q: Ask about function of small intestine.</p>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
7	10 min	To explain function large intestine, rectum, anal canal	<b>Function of large intestine, rectum, anal canal:</b> <ol style="list-style-type: none"> <li>1. Absorption of water</li> <li>2. Absorption of mineral salts, vitamins, and some drugs.</li> <li>3. Synthesise Vit-K and folic acid by bacteria.</li> <li>4. Produce mass movement for food forward movement. (mass movement i.e. strong wave of contraction along the transverse colon forcing the contents into descending and sigmoid colon.</li> <li>5. Temporary storage of faeces.</li> <li>6. Defecation.</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about function of large intestine, rectum, anal canal.

## **SUMMARY & EVALUATION(10 MIN)**

Digestive system is concerned mainly with digestion of food. It is broken into simpler form by many processes of different parts. As teeth are concerned with chewing, biting and grinding. Tongue for sense of taste, swallowing, speech and chewing. Stomach produces HCl, pepsin which cause digestion of protein and protection against microbes invasion. Small intestine is mainly concerned with digestion of carbohydrate and fat And absorption of carbohydrates, proteins, fats, minerals, vitamins and water etc.

**ASSIGNMENT:** draw a table of functions of different parts of GIT.

**EVALUATION:** A test of 50 marks would be taken at the end of unit.

**Bibliography-:**Wagh anne and Grant Allison, “ ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill livingstone Elsevier, pp 292-307.

## **LESSON PLAN**

<b>Subject</b>	: Anatomy & physiology
<b>Unit</b>	: 7
<b>Topic</b>	: <b>Structure and function of accessory organs (Topic no.265)</b>
<b>Group</b>	: G.N.M. 1 <sup>st</sup> Year
<b>Place</b>	: Class Room & Demonstration Room
<b>Date &amp; time</b>	: 60minute
<b>Teaching method</b>	: Lecture cum Discussion
<b>A V aids/instruction aids</b>	: Black board& chalk, chart, PPT.
<b>Students prerequisite</b>	: students should be able to list the accessory organs of the alimentary tract and their structure.
<b>General Objective</b>	: At the end of class the student will be able to acquire knowledge about structure and Functions of accessory organs.
<b>Specific Objective</b>	: <b>At the End Of The Class The Students Will Be Able To</b> <ol style="list-style-type: none"><li>1. To explain about accessory organs of GI system.</li><li>2. To explain salivary gland.</li><li>3. To explain about function of salivary gland.</li><li>4. To explain structure and function of pancreas.</li><li>5. To explain structure and function of liver.</li><li>6. to explain structure and functions of biliary tract.</li></ol>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	2 min	To explain about accessory organ.	<b>Introduction :</b> The alimentary canal has many accessory organs and their secretions help in digestion of food. The following are the accessory organs of GIT : 1. Three pairs of salivary glands 2. Pancreas 3. Liver and bile tract.	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about accessory organ.
2	13 min	To Describe the salivary gland and its structure.	<b>Salivary gland:</b> Three pair of salivary gland found in oral cavity. They open into the mouth through salivary ducts. These gland are 1. Parotid gland 2. Sub mandibular gland 3. Sub lingual gland <b>Parotid gland:</b> These are situated one on each side of jaw, just below the external acoustic meatus. Each gland has the parotid duct (duct of stensen) open into the mouth at the level of the second upper molar tooth.	T: Explain with power point presentation. S: Listen and takes notes.	Q: explain the structure of three salivary glands and the functions of saliva.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p><b>Submandibular gland:</b> These lies one on each side of the face under the angle of the jaw. The two submandibular ducts open on the floor of mouth, one on each side of the fraenulum of the tongue.</p> <p><b>Sublingual gland:</b> These lie under the mucous membrane of the floor of the mouth in front of the submandibular glands. They have small numerous ducts open on the floor of the mouth.</p> <p><b>Structure:</b> The salivary glands are all surrounded by a fibrous capsule. They consist of a number of lobules made up of small acini lined with secretory cells. All salivary gland release her secretion in the mouth through ducts.</p> <p><b>Composition of saliva:</b> About 1.5 litres of saliva produce by salivary Glands. It consist water, mineral salt, salivary</p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
		To explain about function of salivary gland	<p>amylase, mucus, immunoglobulin and lysozyme.</p> <p><b>Function of salivary gland:</b> each salivary gland produce saliva, which perform following function.</p> <ol style="list-style-type: none"> <li>1. Chemical digestion of polysaccharides Polysaccharides <math>\Rightarrow</math> disaccharides.</li> <li>2. Lubrication of food.</li> <li>3. Cleaning of mouth.</li> <li>4. Helps in find the taste of food.</li> <li>5. Non-specific defence against microbial invasion.</li> <li>6. Helps in the sense of taste.</li> </ol>		
3	10 min	Explain about structure and functions pancreas.	<p><b>Pancreas:</b> Pancreas is a pale grey gland weighing about 60 gm. It is about 12-15 cm long and is situated in the epigastric and left hypochondriac regions of the abdominal cavity. It consists of a broad head, a body and a tail. The head lies in “c” shaped curve of the duodenum, the body behind the stomach the</p>	<p>T: Explain with power point presentation. S: Listen and takes notes</p>	<p>Q: Describe the structure and functions of pancreas in brief.</p>



S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>tail in front of left kidney and just reaches the Spleen.</p> <p><b>Microscopic structure of pancreas:-</b> The pancreas is exocrine as well as endocrine organ.</p> <p><b>The exocrine portion</b> consists of large number of lobules. Each lobule is made up of acini. Each acini is lined by pyramidal shaped cells. numerous acini which drain into the small ductules. These ductules unite with similar ductules to form larger ducts in this way a large duct called pancreatic duct ( duct of wirsung). The main pancreatic duct combine with the common bile at its terminal portion, which open into the 2<sup>nd</sup> part of duodenum. Sometimes accessory pancreatic duct is also present.</p> <p><b>The endocrine portion</b> of pancreas : in between the groups of acini, there are masses of cells without any draining duct, looking like small islands, surrounded on sides by the acini, are present. These are called “islets of langerhans”. These endocrine portion don’t have any ducts. They drain their</p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
		To explain function pancreas	<p>secretion directly into the blood. Their secretion include <i>insulin, glucagon and somatostatin</i>.</p> <p><b>Secretion of pancreas:</b> Pancreas secrete pancreatic juice that ph is 8. It consist of:</p> <ul style="list-style-type: none"> <li>- Water</li> <li>- Mineral salt</li> <li>- Enzyme amylase, lipase, nucleases that digest DNA and RNA.</li> <li>- Inactivated enzyme precursor eg: trypsinogen and chymotrypsinogen.</li> </ul> <p><b>Function of pancreas:</b> The pancreas has both exocrine and endocrine function. Exocrine functions produce pancreatic juice. It has following actions:</p> <ol style="list-style-type: none"> <li>1) Digestion of protein: <i>trypsinogen and chymotrypsinogen</i> are inactive enzyme precursor activated by enterokinase of</li> </ol>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>small intestine into active enzyme <i>trypsin and chymotrypsin</i>. That covert polypeptides into tripeptides, dipeptides and amino acids.</p> <p>2) Digestion of carbohydrates: <i>pancreatic amylase</i> convert polysaccharides into disaccharides and monosaccharides not acted upon by <i>salivary amylase</i>.</p> <p>3) Digestion fats: lipase convert fats into fatty acids and glycerol. To aid the action of lipase, bile emulsify the fats.</p> <p>Endocrine functions produce hormone insulin glucagon and somatostatin that regulate blood glucose level.</p>		
4	15 min	To explain about structure and functions liver.	<p><b>Liver:</b></p> <p>Liver is the largest gland of the body. Weight is about 1-2.3 kg. It is situated upper part of abdominal cavity occupying the greater part the right hypochondriac region, part of the epigastric region and extending into the left hypochondric region. Its upper and anterior surface is smooth and curved to fit under the</p>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	<p>Q: Ask about liver and its function.</p>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>surface of the diaphragm, it's posterior surface is irregular in outline.</p> <p><b>Organs associated with liver</b></p> <p>Superior and anterior – diaphragm and anterior abdominal wall.</p> <p>Inferiorly- stomach, bile duct, duodenum, hepatic flexur of colon, right kidney and adrenal gland.</p> <p>Posterior – oesophagus, IVC, aorta, vertebral column, diaphragm etc</p> <p>Laterally: lower ribs and diaphragm.</p> <p><b>Lobes of liver</b></p> <ul style="list-style-type: none"> <li>• The liver is enclosed in a thin inelastic capsule and incompletely covered from supporting ligaments that attach the liver to the inferior surface of diaphragm. It is held in position partly by the ligaments and partly by the pressure of organs in abdominal cavity.</li> <li>• Liver is form by four lobes that is right lobe, left lobe, quadrate lobe and caudate lobe.</li> </ul> <p><b>Structure of liver:</b></p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<ol style="list-style-type: none"> <li>1. Liver is form by four lobes that is right lobe, left lobe, quadrate lobe and caudate lobe.</li> <li>2. The lobes of the liver are made up of tiny functional unit s called lobules.</li> <li>3. Liver lobules are hexagonal in outline and are formed by cuboidal cells called hepatocytes. These hepatocytes are arranged in pairs of columns radiating from a central vein . between two pair of columns of cels are <i>sinusoids</i> ( bloodvessels with incomplete wall.) containing a mixture if blood from tiny portal vein and hepatic artery. This arrangement allow arterial blood and portal blood ( rich in nutrients) to come in close contact with hepatocytrs. Among the cells lining sinusoids, there are liver macrophages ( kuffer cells) whose function is to ingest and destroy worn out blood cells and foreign particle in blood.</li> <li>4. Blood drain from sinusoids into cenral and centrilobular veins, thse join the veins from other lobules formin larger</li> </ol>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>vein. Eventually a hepatic vein is formed. It leave the liver and drain into IVC.</p> <p>5. In lobules of liver there is bile canaliculi on another side of hepatocytes. It means, each column of hepatic cells are lined on one side by sinusoids and other side by bile canaliculi. The bile canaliculi join upto form the right and left hepatic ducts, which drain bile from the liver.</p> <p><b>Secretion of liver:</b> Between 500 to 1000 ml of bile secreted by liver daily. It consists of water, mineral salt, mucus, bile pigment, bile salts and cholesterol.</p> <p><b>Function of liver:</b> 1. Carbohydrate metabolism- it regulate the blood glucose level. It convert</p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>glucose into glycogen when there is excess glucose is available. And convert glycogen into glucose when glucose level falls in blood.</p> <p>2. Fat metabolism- stored fat can be converted by liver to provide energy. By <i>gluconeogenesis</i></p> <p>3. Protein metabolism. It perform following functions</p> <ul style="list-style-type: none"> <li>• De amination of aminoacid i.e. convert nitrogenous portion of amino acids and convert into urea. Which is excreted into urine.</li> <li>• Breakdown nucleis acid into uric acid.</li> <li>• Synthesis of plasm protein.</li> </ul> <p>4. Break down of erythrocytes.</p> <p>5. Kill micro organism.</p> <p>6. Detoxification of drug and toxic substances.</p> <p>7. Inactivation of hormones.</p> <p>8. Production of heat,</p> <p>9. Secretion of bile.</p> <p>10.Storage of glycogen, Vit- A, D, E, K.</p> <p>11.Iron and copper storage.</p>		

**Summary(10min) :** The following are the accessory organs of GIT i.e. Three pairs of salivary glands, Pancreas and Liver and bile tract. Pancreas is a pale grey gland weighing about 60 gm. It is about 12-15 cm long and is situated in the epigastric and left hypochondriac regions of the abdominal cavity. The pancreas is exocrine ( which produce pancreatic juice ) as well as endocrine organ ( which produce hormones like insulin, glucagon and somatostatin.

Liver is the largest gland of the body. Weight is about 1-2.3 kg. It is situated upper part of abdominal cavity occupying the greater part the right hypochondriac region, part of the epigastric region and extending into the left hypochondria region. Liver is form by four lobes that is right lobe, left lobe, quadrate lobe and caudate lobe. It has role in carbohydrate, fat, and protein metabolism, in detoxification of drugs and toxins.

Functions of bile include fat digestion and excretion of bilirubin

**Assignment:** Prepares a chart of liver and pancreas.

**Evaluation:** Class test after compilation of unit IV

**Bibliography:** Wagh ane and Grant Allison, “ ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill livingston Elsevier, pp 286-312.

Choudhary sujit k,” concise medical physiology” 4<sup>th</sup> edition 2002, new central book agency(P) ltd, pp- 74-77,86-95,.



## **LESSON PLAN**

<b>Subject</b>	: Anatomy & physiology
<b>Unit</b>	: VII
<b>Topic</b>	: <b>Process of digestion (Topic no.266)</b>
<b>Group</b>	: G.N.M. 1 <sup>st</sup> Year
<b>Place</b>	: Class Room & Demonstration Room
<b>Date &amp; time</b>	: 60 minute
<b>Teaching method</b>	: Lecture cum Discussion
<b>A V aids/instruction aids</b>	: Black board&chalk, chart, PPT.
<b>Students prerequisite</b>	: students should be able to list the accessory organs of the alimentary tract and their structure.
<b>General Objective</b>	: At the end of class the student will be able to give knowledge regarding Process of digestion.
<b>Specific Objective</b>	At the end of class the student will be able to <ol style="list-style-type: none"><li>1. To explain about digestion in oral cavity.</li><li>2. To explain process of digestion in stomach</li><li>3. To explain process of digestion in small intestine.</li></ol>

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min	To explain process of digestion.	<b>Introduction:</b> The process of food digestion starts from oral cavity and complete most of food digestion in small intestine.	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about process of digestion
2	10 min	To Describe the oral digestion.	<b>Oral digestion:</b> In the mouth, food is chewed and mixed with saliva with the help of teeth and tongue. Saliva contains the enzyme salivary amylase that begins the breakdown of complex sugars, including starches, reducing them to the disaccharide maltose. It works at pH 7. Then the admixture of food and saliva form a bolus. That enters in stomach through oesophagus.	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about oral digestion.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
3	10 min	To describe the stomach digestion.	<b>Digestion in stomach:</b> <ol style="list-style-type: none"> <li>1. Water in gastric juice liquefies the swallowed food.</li> <li>2. Hydrochloric acid stops the function of salivary amylase.</li> <li>3. HCl provide the acid environment for pepsinogens and it activated into active enzyme pepsins or start digestion of protein. Proteins are converted into polypeptides.</li> <li>4. Intrinsic factors are released that are necessary for Vita-B12 absorption in ileum.</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about digestion in stomach.
4	20 min	To explain about chemical digestion in small intestine.	<b>Digestion in small intestine:</b> When acid chime passes into the small intestine, it is mixed with pancreatic juice, bile, and intestinal juice and is in contact with the enterocytes of the villi. The digestion of all nutrients is completed in small intestine. <ol style="list-style-type: none"> <li>1. Trypsinogen and chymotrypsinogens activated by enterokinase and converts in the trypsin and chymotrypsin.</li> <li>2. These enzymes convert polypeptides,</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about small intestine digestion.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>to tripeptides, dipeptides and amino acids.</p> <p>3. Peptidase convert di and tri- peptide into amino- acids.</p> <p>4. Pancreatic amylase converts all polysaccharides in disaccharides. Disaccharides are acted upon by disaccharidase enzyme and converted into substrate like glucose, galactose and fructose.</p> <p>5. Bile : bile salts emulsify fats.</p> <p>6. Lipase converts fats in fatty acids and glycerol.</p>		

**Summary(10min) : at the end of class summaries the topic as though-**

- In mouth Salivary amylase digest starches to disaccharides.
- In stomach HCl denature and stop the action of salivary amylase and convert pepsinogen to active pepsin. Which convert proteins into polypeptides.
- 7. In small intestine pancreatic amylase digest starches to disaccharides ( like sucrose, maltose and lactose). Enterokinase convert trypsinogen and chymotrypsinogen in active form. That digest polypeptides into dipeptides and tripeptides. Peptidase convert di and tri- peptide into amino- acids.
- Bile salts in bile (from liver) emulsify fats. Pancreatic lipase digest fats into fatty acids and glycerol.

**Assignment:** Prepare a chart of digestive process occurring in different parts of GIT.

**Evaluation:** Class test after compilation of unit VII

**Bibliography:**

- Wagh anne and Grant Allison, “ ross and Wilson anatomy and physiology in health and illness” 7<sup>th</sup> edition 2014, Churchill livingston Elsevier, pp 286-313.
- Choudhary sujit k,” concise medical physiology” 4<sup>th</sup> edition 2002, new central book agency(P) ltd, pp-71-115 .

## **LESSON PLAN**

**Subject** : Anatomy & physiology

**Unit** : 7

**Topic** : **Process of Absorption**

**Group** : G.N.M. 1<sup>st</sup> Year

**Place** : Class Room & Demonstration Room

**Date & time** : 60 minute

**Teaching method** : Lecture cum Discussion

**A V aids/instruction aids** : Black board, chalk, chart, LCD, Computer

**General Objective** : At the end of class the student will be able to give knowledge about absorption of food in GI.

**Specific Objective** 1. To explain about process of absorption in different part of GI organs.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min	To explain process of absorption.	<b>Introduction:</b> The process of absorption starts mainly in small intestine and in the large intestine.	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about process of absorption
2	25 min	To Describe the absorption in small intestine.	<b>Absorption of nutrients in small intestine:</b> <ol style="list-style-type: none"> <li>1. Absorption of nutrients from the small intestine through the enterocytes occurs by several processes, including diffusion, osmosis, facilitate diffusion and transport.</li> <li>2. Water moves by osmosis.</li> <li>3. Fatty acids and glycerol are able to diffuse in blood.</li> <li>4. Small number of protein absorb unchanged eg: antibody of breast milk.</li> <li>5. Vitamin and mineral absorbed in small intestine.</li> <li>6. Fat soluble vitamins absorbed into the</li> </ol>	T: Explain with power point presentation. S: Listen and takes notes	Q: Ask about absorption in small intestine.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
3	15 min	To explain about absorption in large intestine.	<p>lacteals along with fatty acids and glycerol.</p> <p>7. Vitamin B12 absorbs in terminal ileum.</p> <p><b>Absorption in large intestine:</b></p> <ol style="list-style-type: none"> <li>1. In large intestine absorption of water occur through osmosis.</li> <li>2. Mineral salts, vitamins and some drugs are also absorbed in blood capillaries from the large intestine.</li> </ol>	<p>T: Explain with power point presentation.</p> <p>S: Listen and takes notes</p>	<p>Q: Ask about absorption large intestine.</p>



**Summary:** Explain the absorption of food in small intestine and large intestine.

**Assignment:** Prepares a chart of villi of intestine.

**Evaluation:** Class test after compilation of lecture.

**Bibliography:**

Ross and Wilson Anatomy and physiology 12<sup>th</sup> edition churchill livingstone elsevier Page no : 286-312

## **LESSON PLAN**

**Subject** : Bio-Science

**Unit** : 7

**Topic** : **Metabolism of food**

**Group** : G.N.M. 1<sup>st</sup>Year

**Place** : Class Room

**Time** : 60minute

**Teaching method** : Lecture cum Discussion

**A V aids/instruction aids:** Black board and chalk, chart and power point presentation.

**Student's prerequisites** : check the previous Knowledge

**General Objective** : At the end of the class student will be able to understand about metabolism of food.

**Specific Objective** : At the end of the class student will be able to

1. Define metabolism.
2. Enlist types of metabolism.
3. Describe carbohydrate metabolism.
4. Describe protein metabolism.
5. Describe fat metabolism.

**Review of Previous Class:** - students have enough knowledge about energy generated by oxidation of carbohydrate, fat and protein.

**Introduction:** -Metabolism constitutes all chemical reactions that occur in the body, using nutrients to provide energy by oxidation of nutrients and to make new or replacement body substances.

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
1.	5 min.	Define metabolism.	<p><b><u>DEFINITION OF METABOLISM:-</u></b>            The sum of the physical and chemical processes in an organism by which its material substance is produced, maintained, and destroyed, and by which energy is made available.</p>	T: Defined metabolism and S: Listen attentively and takes notes.	Define metabolism?
2.	5min	Enlist types of metabolism.	<p><b><u>TYPES OF METABOLISM:-</u></b>            There are two types of metabolism according to process involved in metabolism of food:</p> <ol style="list-style-type: none"> <li><b>Catabolism:</b>              In this process break down of large molecules into smaller ones releasing chemical energy, which is stored as ATP and heat.</li> <li><b>Anabolism:</b>              In this process building up or synthesis of large molecules from smaller ones and requires a source of energy usually ATP. On oxidation of fat, protein and carbohydrate energy is produced that is as follows:-</li> </ol>	T: Enlisting types of metabolism and S: Listen attentively and takes notes.	Enlist types of metabolism?

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
3.	15 min	Describe carbohydrate metabolism.	<p>➤ 1 gm fat provides = 9 kcal</p> <p>➤ 1 gm protein provides = 4kcal</p> <p>➤ 1 gm carbohydrate provides = 4 kcal</p> <p><b><u>CARBOHYDRATE METABOLISM:-</u></b></p> <ul style="list-style-type: none"> <li>• Absorb carbohydrate mainly metabolise in liver.</li> <li>• Glucose may be oxidised to provide the chemical energy in the form of ATP.</li> <li>• Excess glucose of blood is stored in liver or skeletal muscle in glycogen form by the hormone insulin.</li> <li>• During the body needs the glycogen break down and convert in glucose by the action of hormone glucagon, epinephrine and thyroxin hormone.</li> <li>• When glycogen store of body is low the body form the glucose by non carbohydrate source e. g. amino acids and glycerol. This process is called</li> </ul>	<p>T: Described carbohydrate metabolism and</p> <p>S: Listen attentively and takes notes.</p>	Describe carbohydrate metabolism?

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
4.	15 min	Describe protein metabolism.	<p>gluconeogenesis.</p> <p><b><u>PROTEIN METABOLISM:-</u></b></p> <p>Protein metabolism denotes the various biochemical processes responsible for the synthesis of proteins and amino acids, and the breakdown of proteins (and other large molecules, too) by catabolism.</p> <p>Dietary proteins are first broken down to individual amino acids by various enzymes and hydrochloric acid present in the gastrointestinal tract. These amino acids are further broken down to <math>\alpha</math>-keto acids which can be recycled in the body for generation of energy, and production of glucose or fat or other amino acids. This break-down of amino acids to <math>\alpha</math>-keto acids occurs in the liver by a process known as transamination, which follows a bimolecular ping pong mechanism.</p> <p>Protein is form by the amino acids. About 20 amino acids are need for different protein synthesis in body.</p> <ul style="list-style-type: none"> <li>• <b>Essential amino acids:</b></li> </ul>	<p>T: Described protein metabolism and</p> <p>S: Listen attentively and takes notes.</p>	Describe protein metabolism?

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
			<p>Nine amino acids out of 20 are not form by the body is called essential amino acids.</p> <ul style="list-style-type: none"> <li>• <b>Non essential amino acids:</b> These amino acids are formed by the body tissue. Body form the amino acids with the help of enzyme transaminase.</li> </ul> <p><b><u>PROTEIN SYNTHESIS:-</u></b></p> <p>Protein biosynthesis relies on four processes:</p> <ul style="list-style-type: none"> <li>• amino acid synthesis</li> <li>• RNA synthesis</li> <li>• transcription</li> <li>• translation</li> </ul> <p>Protein anabolism is the process by which protein are formed from amino acids.</p> <p><b><u>PROTEIN BREAK DOWN:-</u></b></p> <p>Protein catabolism is the process by which proteins are broken down to their amino acids. This is also called proteolysis.</p> <p>This can be followed by further amino acid degradation.</p>		

S. No.	Time	Specific objective	Content	Teaching learning activities	Evaluation
5.	15 min	Describe fat metabolism.	<p><b><u>FAT METABOLISM:-</u></b></p> <ul style="list-style-type: none"> <li>-Fat is synthesised from excess dietary carbohydrate, proteins, and stored in fat deposit under the skin and fat tissue of body.</li> <li>-Fat have been digested and absorbed as fatty acids and glycerol in the blood.</li> <li>-The liver some fatty acids and glycerol are used to provide energy and heat and some are recombined forming the triglycerides, the form in which the fat is stored.</li> <li>-A triglyceride consists of three fatty acids chemically combined with glycerol molecule.</li> <li>-When required triglycerides convert in fatty acids and glycerol and used to provide energy.</li> <li>-The end product of fat metabolism is chemical energy, heat, carbon dioxide and water.</li> </ul>	<p>T: Described fat metabolism and</p> <p>S: Listen attentively and takes notes.</p>	Describe fat metabolism?

**SUMMARY AND EVALUATION:- ( 10 MIN. )**

Today we discussed about the metabolism, types of metabolism, carbohydrate metabolism, protein metabolism and fat metabolism.

**EVALUATION:-**

- What do you mean by metabolism?
- What are the types of metabolism?

**ASSIGNMENT:** - Define metabolism enlist its type and describe fat metabolism.

**BIBLIOGRAPHY:-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill living stone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 313-318
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n. 806-846



## LESSON PLAN

Subject	: Bio-science
Unit	: VIII, The Excretory System.
Topic	: <b>Topic-269, Structure &amp; Function Of Kidney, Ureters.</b>
Group	: GNM I Year Students
Place	: Class Room & Demonstration Room.
Date & Time	: 60 minutes
Teaching method	: Lecture cum demonstration
AV aids / instructional aids	: Black board and chalk, LCD computer, photo Atlas and Models.
Student Pre requisite	: The student should be able to gain knowledge of structure & function of kidney, ureter And importance of maintain body homeostasis.
General Objective	: At the end of class the student will be able to gain knowledge of structure & function of Kidney and ureters effectively.
Specific Objectives: At the end of class the student will be able to –	
1. Enlist parts of renal system.	
2. Describe the external structure of kidney.	
3. Describe the internal structure of kidney.	

4. Enumerate function of kidney.

5. Describe the structure & Function of ureters.

**Review of previous class:**

- Ask the questions regarding various excretory waste product & patterns of their elimination.
- Ask the questions about various life processes essential for Bio life.

**Introduction:**

- Ask the students about kidney & ureter.
- Tell a story about a person under going renal dialysis.
- Brain storm what they think How important the proper functioning of kidney & ureter.
- At the end of session students must discuss the structure & Function of kidney & ureter.

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Enlist parts of renal system.	<p><b><u>PARTS OF RENAL SYSTEM:-</u></b></p> <p>Excretory system consists of following organs.</p> <ul style="list-style-type: none"> <li>➤ kidney                      2</li> <li>➤ ureter                        2</li> <li>➤ urinary bladder        1</li> <li>➤ urethra                      1</li> </ul>	<p>T: Enlisting parts of renal system with photo Atlas and</p> <p>S: Listening attentively, observing and takes notes.</p>	Enlist parts of renal system?
2.	10 min	Describe the external structure of kidney.	<p><b><u>EXTERNAL STRUCTURE OF KIDNEY:-</u></b></p> <ul style="list-style-type: none"> <li>➤ No-2</li> <li>➤ Shape – Bean Shape</li> <li>➤ Colour – Brownies red</li> </ul>	<p>T: Described the external structure of kidney with</p>	Describe the external structure of

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>Location –</p> <ul style="list-style-type: none"> <li>➤ Retro peritoneal (Behind &amp; outside) the peritoneal cavity on the posterior wall by abdomen from the 12<sup>th</sup> thoracic vertebra to 3<sup>rd</sup> Lumber Vertebrae.</li> </ul> <p>Position -</p> <ul style="list-style-type: none"> <li>➤ Rt kidney is slightly lower than Lt kidney due to Location of the occupied Liver.</li> </ul> <p>Weight -</p> <ul style="list-style-type: none"> <li>➤ Adult -113gm to 170gm (4.5 oz)</li> </ul> <p>Length –</p> <ul style="list-style-type: none"> <li>➤ 10 -12 cm.</li> </ul> <p>Width –</p> <ul style="list-style-type: none"> <li>➤ 6 cm</li> </ul> <p>Thickness –</p>	<p>photo Atlas</p> <p>S: Listening attentively, observing and takes notes.</p>	kidney?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>➤ 2.5 cm.</p> <p>Protection –</p> <p>➤ External Protection by rib &amp; muscles of abdomen &amp; back.</p> <p>➤ Internal protection by surrounding fat.</p> <p>Attachment gland –</p> <p>➤ Adrenal gland lies on the top of each kidney independent in terms of function &amp; blood supply.</p>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3.	15 min	Describe the internal structure of kidney.	<p><b><u>INTERNAL STRUCTURE OF KIDNEY:-</u></b></p> <p><b>Renal capsule</b></p> <p>Each kidney have – 2 parts which are as follows:</p> <ul style="list-style-type: none"> <li>➤ <b>Cortex</b> <ol style="list-style-type: none"> <li>1. Outer part</li> <li>2. Width 1 cm.</li> </ol> </li> <li>➤ <b>Medulla</b> <ol style="list-style-type: none"> <li>1. Inner Part</li> <li>2. Width 5cm.</li> <li>3. Loop of Henley</li> <li>4. Pyramids-8-18</li> </ol> </li> </ul> <p><b>Nephron –</b></p> <ul style="list-style-type: none"> <li>➤ Structure &amp; Functional with of kidney</li> <li>➤ Total no. - Approximate 1 million in each kidney.</li> </ul>	<p>T: Described the internal structure of kidney with PPT</p> <p>S: Listening attentively, observing and takes notes</p>	Describe the internal structure of kidney?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ 2 kind of Nephrons               <ol style="list-style-type: none"> <li>1. Cortical Nephrons – 80% to 85% of total no.</li> <li>2. Juxta Medullary Nephrons – 15% to 20% of total no.</li> </ol> </li> <li>➤ Cortex &amp; medulla opens at the hilum of renal pelvis.</li> <li>➤ <b>Renal Pelvis</b> – concave portion of kidney, It is the collecting &amp; transporting system of urine.</li> <li>➤ Once the urine leaves the renal pelvis the composition &amp; amount of urine does not change.</li> <li>➤ <b>Glomerulus</b> – Capillary bed of efferent &amp; afferent arterioles.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Bowman's capsule.</li> <li>➤ Nephron is responsible for making adjustment of filtration according to body needs.</li> <li>➤ <b>Renin Hormone</b> <ol style="list-style-type: none"> <li>1. Glomerulus is the site of production of rennin hormone. Harmon rennin controls the arterial blood pressure by vasoconstriction and vasodilation, essential for proper functioning of Glomerulus.</li> </ol> </li> <li><b>Blood Supply of Kidney –</b> <ul style="list-style-type: none"> <li>➤ Renal artery – It enters in to kidney.</li> <li>➤ Renal vein – It leave kidney.</li> </ul> </li> <li>➤ Kidney receive 20% of total cardiac output means Blood circulate 1200 ml per minutes.</li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	10 min	Enumerates function of kidney.	<b><u>FUNCTION OF KIDNEY :-</u></b> <ul style="list-style-type: none"> <li>➤ Urine Formation.</li> <li>➤ Excretion of waste product.</li> <li>➤ Regulation of electrolytes.</li> <li>➤ Control of water balance.</li> <li>➤ Control of Blood pressure.</li> <li>➤ Renal clearance.</li> <li>➤ Regulation of RBC production.</li> <li>➤ Synthesis of vitamin-D to active form.</li> <li>➤ Secretion of prostaglandins.</li> <li>➤ Regulate Ca &amp; P balance</li> <li>➤ Activate growth Hormones.</li> </ul>	<p>T: Enumerates function of kidney by using black Board.</p> <p>S: Listening attentively, observing and takes notes.</p>	Enumerate function of kidney?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5.	10 min	Describe the structure & Function of ureters.	<b>URETERS:-</b> <ul style="list-style-type: none"> <li>➤ Long and narrow fibro muscles tube connects each kidney to the bladder.</li> <li>➤ No. 2 (one pair)</li> <li>➤ Length – 24 to 30 cm ureter is slightly shorter than Rt ureter.</li> <li>➤ Originate – At lower portion of renal pelvis.</li> <li>➤ Terminate – At the trigone of the bladder wall.</li> <li>➤ Lining of ureter – urothelium – It prevents reabsorption of urine.</li> <li>➤ Urine moves by peristaltic movement of smooth muscles of ureteric wall.</li> </ul> <p>Hydrostatic &amp; Gravity also contribute in peristaltic movement.</p>	<p>T: Describe the structure &amp; Function of ureters by using black Board.</p> <p>S: Listening attentively, observing and takes notes.</p>	Describe the structure & Function of ureters?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>There is no anatomical valve at the opening of each ureter into urinary bladder.</p> <p><b><u>LAYERS :-</u></b></p> <ol style="list-style-type: none"> <li>1. Mucosa – Inner most Layer –               <ol style="list-style-type: none"> <li>1. Goblet cells &amp; mucosa secretes mucus which prevents the cells from coming contact with urine.</li> </ol> </li> <li>2. Muscularis Layer –               <ol style="list-style-type: none"> <li>1. Middle or inter mediate layer.</li> <li>2. Inner – Longitudinal Smooth muscle layer.</li> <li>3. Outer – Circular Smooth muscle Layer.</li> </ol> </li> <li>3. Adventita –               <ol style="list-style-type: none"> <li>1. Outer or superficial layer it contains blood vessels, Lymph vessels and nerves that serve the muscularis and mucosa.</li> </ol> </li> </ol> <p><b><u>FUNCTION :-</u></b>Each of the ureter transport urine from the renal pelvis of the kidney of the urinary bladder.</p>		

**SUMMARY : & EVALUATION (10 MIN):-**

- Today we discussed about the parts of the renal system, external structure of kidney, internal structure of kidney, function of kidney and structure & Function of ureters.

**ASSIGNMENT :-**

- Describe the structure and function of kidney & ureter and also draw a labelled diagram of kidney?

**EVALUATION :-**

- What are the parts of kidney?
- What are the functions of kidney?

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 337-358
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition, 1999, p.n. 850-861

## LESSON PLAN

Subject	: Bio- Science
Unit	: (VIII )the excretory system
Topic	: <b>270, Structure And Function Of Urinary Bladder &amp; Urethra</b>
Group	: GNM I Year students
Place	: Class- Room & Demonstration Room.
Date & Time	: 60 minutes
Teaching method	: Lecture cum Demonstration
AV aids / instructional aids	: Black Board and Chalk, power point and Photo atlas Model.
Student Pre requisite	: The student should be able to gain knowledge regarding structure & function of urinary Bladder and urethra.
General Objective	: At the end of the class the student will be able to gain knowledge regarding structure & function of urinary bladder & urethra and apply acquired knowledge during clinical practices.
Specific Objectives	: At the end of the class the students will be able to – <ol style="list-style-type: none"><li>1. Describe the structure of urinary bladder.</li><li>2. Describe histology &amp; function of urinary bladder.</li><li>3. Describe structure &amp; Function of urethra.</li></ol>

4. Discusses about urinary incontinence.

Review of previous class: Ask questions regarding structure & function of kidney, urethra and specially nephrons.

**Introduction:**

- Ask the student if they know the structure and function of kidney & urethra.
- Ask the question about a person unable to void urine.
- Ask the end of session student must discuss the structure & function of urinary bladder & urethra.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Describe the structure of urinary bladder.	<p><b><u>STRUCTURE OF URINARY BLADDER:-</u></b></p> <p>Urinary bladder</p> <ul style="list-style-type: none"> <li>➤ It is a muscular, hollow see like structure.</li> <li>➤ It provides storage of urine.</li> </ul> <p>Location –</p> <ul style="list-style-type: none"> <li>➤ In the pubic cavity, behind public bone.</li> </ul> <p>Capacity –</p> <ul style="list-style-type: none"> <li>➤ 700-800 ml.</li> </ul> <p>Opening –</p> <ul style="list-style-type: none"> <li>➤ 2 urethra (inlets)</li> <li>➤ 1 urethra (outlet)</li> <li>➤ Area of bladder neck is called urethra vesicle function.</li> </ul>	<p>T: Described the structure of urinary bladder with photo Atlas</p> <p>S: Listening attentively, observing and takes notes.</p>	Describe the structure of urinary bladder?

2.	15 min	Describe histology & function of urinary bladder.	<p><b><u>HISTOLOGY OF URINARY BLADDER:-</u></b></p> <p>The wall of Bladder – 4 layers –</p> <ul style="list-style-type: none"> <li>➤ Outer most – Adventitia</li> <li>➤ Dutrutor – Smooth muscle layer beneath adventitia.</li> <li>➤ Sub mucosal lining.</li> <li>➤ Inner most – Mucosal lining.</li> </ul> <p>These layers are impermeable to water &amp; prevent reabsorption of urine stored in the bladder.</p> <ul style="list-style-type: none"> <li>➤ Smooth muscles of bladder neck form the internal sphincter.</li> </ul> <p><b><u>FUNCTION OF URINARY BLADDER :-</u></b></p> <ul style="list-style-type: none"> <li>➤ It provides storage of urine.</li> </ul>	<p>T: Described histology &amp; function of urinary bladder with photo Atlas</p> <p>S: Listening attentively, observing and takes notes.</p>	Describe histology & function of urinary bladder
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S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	10 min	Describe structure & Function of urethra.	<p><b><u>STRUCTURE URETHRA:-</u></b></p> <p>Urethra –</p> <ul style="list-style-type: none"> <li>➤ Terminal part of urinary system.</li> <li>➤ Opens outside the body.</li> <li>➤ Passage way for discharging urine.</li> </ul> <p>In Male –</p> <ul style="list-style-type: none"> <li>➤ It pass through the penis</li> <li>➤ It is surrounded by prostate gland prospering &amp; laterally at the bladder neck.</li> </ul> <p>In Female –</p> <ul style="list-style-type: none"> <li>➤ It directly opens at outside the body.</li> </ul> <p><b><u>FUNCTION OF URETHRA :-</u></b></p> <p><b>Micturation</b></p> <ul style="list-style-type: none"> <li>➤ The act of passing urine or voiding or urination is called micturation.</li> </ul>	<p>T: Describe structure &amp; Function of urethra with photo Atlas and ppt.</p> <p>S: Listening attentively, observing and takes notes.</p>	Describe structure & Function of urethra?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15 min	Dicuss about urinary in continence.	<p><b><u>URINARY IN CONTINENCE :-</u></b></p> <ul style="list-style-type: none"> <li>➤ Inability to voluntary control over micturation.</li> </ul> <p><b><u>TYPES OF URINARY INCONTINENCE:-</u></b></p> <p>There are four main types of incontinence :-</p> <ul style="list-style-type: none"> <li>➤ Urge incontinence due to an overactive bladder</li> <li>➤ Stress incontinence due to poor closure of the bladder</li> <li>➤ Overflow incontinence due to either poor bladder contraction or blockage of the urethra</li> <li>➤ Functional incontinence due to medications or health problems making it difficult to reach the bathroom</li> </ul>	<p>T: Discusses about urinary in continence by using ppt.</p> <p>S: Listening attentively, observing and takes notes.</p>	Dicuss about urinary in continence?

**SUMMARY : & EVALUATION (10 MIN):-**

- Today we discussed about the structure of urinary bladder, histology & function of urinary bladder, structure & Function of urethra, urinary in continence and its type.

**ASSIGNMENT :-**

- Describe the structure & Function of urinary bladder and urethra?

**EVALUATION :-**

- What are the functions of urinary bladder and urithera?
- What is the histological structure of urinary bladder?

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 337-358
2. Tortora Gerard J., Grabowski S.R. ,“ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n. 850-861

## LESSON PLAN

Subject	: Bio- Science
Unit	: (VIII) the excretory system
Topic	: <b>271, Formation &amp; composition of urine.</b>
Group	: GNM 1 <sup>st</sup> year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum Demonstration
AV aids / instructional aid	: Black Board, Chalk and PPT
Student Pre requisite	: The student should be well oriented about the charts, models and specimen of renal system.
General Objective	: At the end of the class the student will be able to acquire knowledge about formation & Composition of urine successfully.

Specific Objectives : At the end of the class the students will be able to:-

- Describe the mechanism of formation of urine.
- Enumerates the Physical & Chemical composition of urine.

Review of previous class: Ask questions regarding kidney, ureter, Bladder & urethra.

**Introduction:** Ask the student about formation & composition of urine.

- At the end of class the students must discuss about formation & composition of urine.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	30 min	Describe the mechanism of formation of urine.	<p>Formation of urine -</p> <ul style="list-style-type: none"> <li>➤ Urine is formed in the nephrons through a complex 3 step process-               <ol style="list-style-type: none"> <li>1. Glomerular Filtration.</li> <li>2. Tubular Rebsorption.</li> <li>3. Tubular secretion.</li> </ol> </li> </ul> <p>Glomerular Filtration –</p> <ul style="list-style-type: none"> <li>➤ It takes place through the semi permeable walls of Glomerulus &amp; Glomerular capsule.</li> <li>➤ Water &amp; Small molecules – pass through it membrane (Later may be reabsorbed)</li> <li>➤ Blood cells, plasma protein and other large molecules are too large to filter.</li> </ul> <p>Filtration take place due to –</p> <ul style="list-style-type: none"> <li>➤ Capillary hydrostatic pressure (7.3 k Pa. or</li> </ul>	<p>T: Described the mechanism of formation of urine by use of black board &amp; PPT.</p> <p>S: Listening attentively, observing and takes notes.</p>	Describe the mechanism of formation of urine?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>55mm Hg.) build up in glomerulus &amp; due to different. Diameter of efferent &amp; afferent arterioles.</p> <ul style="list-style-type: none"> <li>➤ Osmotic pressure – (4 k Pa. or 30 mm Hg.)</li> <li>➤ Filtrate Hydrostatic pressure – 2k Pa. or 15mm Hg.</li> </ul> <ol style="list-style-type: none"> <li>1. Net filtration pressure – <ul style="list-style-type: none"> <li>➤ <math>7.3 - (4+2) = 1.3 \text{ K Pa.}</math></li> <li>➤ <math>55 - (30+15) = 10 \text{ mm Hg.}</math></li> </ul> </li> <li>2. GFR – Glomerular Filtration Rate. <ul style="list-style-type: none"> <li>➤ Volume of filtrate formed by both kidney each minute</li> </ul> <p>normal GFR – 125 ml (min)</p> </li> </ol> <p>Selective Re-absorption –</p> <p>Process by which the composition &amp;</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Volume of glomerular filtrate are altered during its process through convoluted tubules, medullary.</li> <li>➤ These filtrate needed to maintain fluid, electrolyte balance and pH of blood are selectively re-absorbed.</li> </ul> <p>Selective Re –absorbed constituents –</p> <ul style="list-style-type: none"> <li>➤ Glucose, amino– acids.</li> <li>➤ Na. P., K., P and chlorides.</li> </ul> <p>Hormone essential for selective re-absorption –</p> <ul style="list-style-type: none"> <li>➤ Para thyroid Hormone – Regulate re-absorption of Ca &amp; P.</li> <li>➤ Anti diuretic Hormone – Regulate water re-absorption.</li> <li>➤ Aldosterone Hormone – Regulate re-absorption of Na. &amp; Excretion of K.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	20 min.	Enumerates the Physical & Chemical composition of urine.	<p><b><u>PHYSICAL COMPOSITION OF URINE:-</u></b></p> <ol style="list-style-type: none"> <li><b>Quantity:</b> The quantity averages 1500 to 2000 ml in an adult man daily. It may vary with the amount of fluid taken. In fact it is linked with the protein metabolism; higher is the protein intake higher will be the urinary output since the urea produced from the protein needs to be flushed out from the body. Higher is the urea production in the body, the higher is the volume of urine to excrete it.</li> <li><b>Color:</b> The color should be clear pale amber without any deposits. However, a light flocculent cloud of mucus may sometimes be seen floating in the normal urine.</li> <li><b>Specific gravity:</b> It varies from 1.010 to</li> </ol>	<p>T: Enumerates the Physical &amp; Chemical composition of urine by use of black board &amp; PPT.</p> <p>S: Listening attentively, observing and takes notes.</p>	Enumerates the Physical & Chemical composition of urine?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>1.025. Specific gravity is determined with <b>urinometer</b>.</p> <p>iv. <b>Odor:</b> The odor is aromatic.</p> <p>v. <b>Reaction:</b> The reaction of normal urine is slightly acidic with an average pH of 6.0.</p> <p><b><u>CHEMICAL COMPOSITION OF URINE:-</u></b></p> <p>Chemical composition of urine in human are as follows:-</p> <p>Total solids in urine add up to around 59 grams per person. Note compounds you ordinarily do not find in human urine in appreciable amounts, at least compared with blood plasma, include protein and glucose (typical normal range 0.03 g/l to 0.20 g/l). Presence of significant levels of protein or sugar in urine indicates potential health concerns.</p>		

S.No	Time	Specific objective	Content		Teaching Learning activity	Evaluation
			Chemical	Concentration in g/100 ml urine		
			water	95		
			urea	2		
			sodium	0.6		
			chloride	0.6		
			sulphate	0.18		
			potassium	0.15		
			phosphate	0.12		
			creatinine	0.1		
			ammonia	0.05		
			uric acid	0.03		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation								
			<table><tr><td>calcium</td><td>0.015</td></tr><tr><td>magnesium</td><td>0.01</td></tr><tr><td>protein</td><td>--</td></tr><tr><td>glucose</td><td>--</td></tr></table> <p><b><u>CHEMICAL ELEMENTS IN HUMAN</u></b></p> <p><b><u>URINE:-</u></b> The element abundance depends on diet, health, and hydration level, but human urine consists of approximately:</p> <p>oxygen (O): 8.25 g/l</p> <p>nitrogen (N): 8/12 g/l</p> <p>carbon (C): 6.87 g/l</p> <p>hydrogen (H): 1.51 g/l</p>	calcium	0.015	magnesium	0.01	protein	--	glucose	--		
calcium	0.015												
magnesium	0.01												
protein	--												
glucose	--												

**SUMMARY : & EVALUATION (10 MIN):-**

- Today we discussed about the mechanism of formation of urine and Physical & Chemical composition of urine.

**ASSIGNMENT :-**

- Describe the mechanism of formation of urine?

**EVALUATION :-**

- What is the feature of normal urine?
- What is the chemical composition of normal urine?

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 337-358
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition, 1999, p.n. 850-861

## LESSON PLAN

Subject	: Bio- Science
Unit	: VIII The Excretory System
Topic	: <b>272-Fluid and Electrolyte balance</b>
Group	: GNM First year.
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum Demonstration
AV aids / instructional aids	: Black Board, Chalk, LCD, Computer.
Student Pre requisite	: The student should be able to gain knowledge about fluid and electrolyte balance and Its importance in Homeostasis and apply their knowledge in clinical practices.
General Objective	:student should be enough knowledge about the anion, cation, acid, base and other Element found in body fluid.

**Specific Objectives :** At the end of the class the students will be able to –

1. Enlist the types of the body fluids.
2. Describe the fluids and electrolytes balance.
3. Explain the fluid balance.
4. Enumerate the electrolytes balance.

**Review of previous class :** Ask questions regarding structure and functions of kidney process urine formation etc

**Introduction:** - we discussed about the types of the body fluids, fluids and electrolytes balance, fluid balance and the electrolytes balance.

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
1.	10 min	Enlist the types of the body fluids.	<p><b><u>BODY FLUID:-</u></b></p> <p>Body fluids divided into two distinct compartment which are as follows:</p> <ol style="list-style-type: none"> <li>1. <b><u>INTRACELLULAR:-</u></b> - Intracellular fluid comprises all fluids within the body cell. It constitutes 40% of body weight and Constitute <b>80%</b> or 2/3 part (Fluid within the cell) of total fluid. These are further divided in to two parts interstitial and intravascular.</li> <li>2. <b><u>EXTRACELLULAR:-</u></b> Constitute 20% of body weight or 1/3 of Total (Or Intracellular) fluid. <ul style="list-style-type: none"> <li>➤ e.g. Blood plasma</li> <li>➤ Lymph</li> <li>➤ CSF</li> </ul> </li> </ol>	<p>Teacher</p> <p>Enlisting the types of the body fluids with - PPT</p> <p>Students- Listening attentively and observe the PPT and takes notes.</p>	Enlist the types of the body fluids?

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
2.	10min	Describe the fluids and electrolytes balance.	<ul style="list-style-type: none"> <li>➤ Gastro- intestinal fluid</li> <li>➤ Fluid of Eye and Ears</li> <li>➤ Pleural fluid</li> <li>➤ Pericardial fluid</li> <li>➤ Peritoneal fluid</li> <li>➤ Glomerular fluid</li> </ul> <p><b><u>FLUID AND ELECTROLYTE BALANCE:-</u></b></p> <ul style="list-style-type: none"> <li>• The healthy human body consist of 60% water.</li> <li>• Osmo regulation is the one of the main function of kidney</li> <li>• When high fluid intake –Excretion of large volume of dilute urine.</li> <li>• When low fluid intake- Excretion of small amount of concentrated urine.</li> </ul>	<p>Teacher</p> <p>Described the fluids and electrolytes balance.</p> <p>with - PPT</p> <p>Students-</p>	Describe the fluids and electrolytes balance?



S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation																				
			<p><b><u>NORMAL FLUID INTAKE PER DAY AND</u></b> <b><u>NORMAL FLUID LOSS BY BODY PER DAY:-</u></b></p> <table><tr><td>Fluid gain</td><td>ml</td><td>Fluid loss</td><td>ml</td></tr><tr><td>Oral fluids</td><td>1100-1400</td><td>kidney</td><td>1200-1500</td></tr><tr><td>Solid foods</td><td>800-100</td><td>Sweat</td><td>100-200</td></tr><tr><td>metabolism</td><td>300</td><td>Gastrointestinal insensible losses</td><td>100-200</td></tr><tr><td></td><td></td><td>Lungs</td><td>350-400</td></tr></table>	Fluid gain	ml	Fluid loss	ml	Oral fluids	1100-1400	kidney	1200-1500	Solid foods	800-100	Sweat	100-200	metabolism	300	Gastrointestinal insensible losses	100-200			Lungs	350-400	Listening attentively and observe the PPT and takes notes.	
Fluid gain	ml	Fluid loss	ml																						
Oral fluids	1100-1400	kidney	1200-1500																						
Solid foods	800-100	Sweat	100-200																						
metabolism	300	Gastrointestinal insensible losses	100-200																						
		Lungs	350-400																						

S.No	Time	Specific Objective	Content				Teaching & Learning Activities.	Evaluation
					skin	350-400		
			Total gain	2200-2700	Total loss	2300-2700		
			<u>Measurement of fluid status</u> - It is done by daily weight measurement one pound is equal approximately of 50ml fluid. (change is 1 pound of weight could suggest and overall fluid gain or fluid loss of 50ml)					

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
3.	15min	Explain the fluid balance.	<p><b><u>FLUID BALANCE:-</u></b></p> <p><b><u>Osmo regulation by kidney-</u></b></p> <p>By three step process- Glomerular filtration</p> <ul style="list-style-type: none"> <li>- Tubular Reabsorption</li> <li>- Tubular secretion</li> </ul> <p>-Water electrolyte and other substance such a glucose creatinine are filtered by Glomerulus</p> <p>- Varying amount of these substances are reabsorbed ion the renal tubules or excreted in the urine</p> <p><b><u>Role of Antidiuretic hormone ADH and Vasopressin</u></b></p> <p>ADH is secreted by posterior pituitary gland in</p>	<p>Teacher</p> <p>Explaining the fluid balance with - PPT</p> <p>Students- Listening attentively and observe the PPT and takes notes.</p>	Explain the fluid balance?

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
4.	15min	Enumerate the electrolytes	<p>response to change in osmolality of the blood.</p> <p><b><u>When water intake decrease</u></b></p> <p>The osmolality of blood also increases</p> <ul style="list-style-type: none"> <li>- ADH releases and acts on kidneys and water and reabsorption increases and returning to osmolality of blood normal level.</li> </ul> <p><b><u>When water intake increases</u></b></p> <ul style="list-style-type: none"> <li>-Secretion of ADH suppressed.</li> <li>- Less water is reabsorbed by kidney tubules so the volume of urine increases (Diuresis )</li> </ul> <p><b><u>ELECTROLYTE BALANCE:-</u></b></p> <ul style="list-style-type: none"> <li>-When the kidneys are functioning normally the amount of electrolyte excreted per day is equal to the</li> </ul>	Teacher Enumerates	Enumerate the electrolytes

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
		balance.	<p>amount ingested.</p> <p>Name of electrolyte – Na<sup>+</sup> Sodium</p> <p>Normal Range -----135-145mmol/L</p> <p>Deficiency- -----Hyponatremia</p> <p>Excess- -----Hypernatremia</p> <p>Controlled by -----Aldosterone ADH Natriuretic peptide</p> <p>Name of electrolyte – Cl<sup>-</sup> Chloride</p> <p>Normal Range -----95 -105mEq/L</p> <p>Deficiency- -----Hypochloremia</p> <p>Excess- -----Hyperchloremia</p> <p>Controlled by ----- ADH process that increases or decreases renal reabsorption of Na<sup>+</sup></p> <p>Name of electrolyte – K<sup>+</sup> Potassium</p>	<p>the electrolytes balance with - PPT</p> <p>Students- Listening attentively and observe the PPT and takes notes.</p>	balance?

S.No	Time	Specific Objective	Content	Teaching & Learning Activities.	Evaluation
			<p>Normal Range -----3.5-5.0mEq/L</p> <p>Deficiency- -----Hypokalamia</p> <p>Excess- -----Hyperkalamia</p> <p>Controlled by ----- Aldosteron</p> <p>Name of electrolyte – Ca<sup>++</sup> Calcium</p> <p>Normal Range -----5.9 -10.5mg/dl</p> <p>Deficiency- -----Hypocalaemia</p> <p>Excess-----Hypercalcaemia</p> <p>Controlled by-----Parathyroid Hormone,calcitriol</p> <p>Name of electrolyte – PO<sub>4</sub><sup>+</sup> Phosphate</p> <p>Normal Range -----1.7 -2.5 mEq/L</p> <p>Deficiency- -----Hypophosphatemia</p> <p>Excess- -----Hypephosphatemia</p> <p>Controlled by ----- Parathyroid Hormone,calcitriol.</p>		

**SUMMARY : & EVALUATION (10 MIN) :-**

- Today we discussed about the types of the body fluids, fluids and electrolytes balance, fluid balance and the electrolytes balance.

**ASSIGNMENT :-**

- Describe fluid and electrolyte balance?

**EVALUATION:-**

- What are the types of body fluids?

**BIBLIOGRAPHY: -**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill Livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 22-30
2. Tortora Gerard J., Grabowski S.R. “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n. 904-908

## LESSON PLAN

Subject	: Bio – Science
Unit	: VIII The excretory system
Topic	: <b>273 – Structure &amp; function of the skin.</b>
Group	: GNM First Year
Place	: Class – Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum demonstration
AV aids / instructional aids	: Black board, chalk, LCD, projector, computer.
Student Pre requisite	: Student should be able to gain knowledge about structure & Function of the skin.
General Objective	: At the end of the class the students will be able to gain knowledge regarding structure & Function of the skin and apply this knowledge in clinical practice.
Specific Objectives	: At the end of the class the students will be able to – <ol style="list-style-type: none"><li>1. Describe structure of skin.</li><li>2. Enlist functions of skin.</li></ol>



Review of previous class :

- Ask question regarding excretory waste product and their patterns of elimination.

**Introduction:**

- Ask the question about importance of skin, in human life.
- Tell a story of a burn patient undergoing skin graft.
- At the end of the class the student should discuss regarding structure & function of skin.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	30min	Describe structure of skin.	<p><b><u>STRUCTURE OF SKIN :-</u></b></p> <ul style="list-style-type: none"> <li>➤ It covers the external surface of the body.</li> <li>➤ It is the largest organ of the body.</li> <li>➤ It contributes 16% of total body weight.</li> <li>➤ Thickness – 0.5mm on eyelids 4 mm on heels. Normal thickness 1-2mm.</li> <li>➤ Dermatology – Medical speciality deals with the diagnosis and treatment of integumentary system's disorders.</li> <li>➤ Layers of skin – 2 layers Epidermis Dermis</li> </ul>	<p>T: Described structure of skin by using black board.</p> <p>S: Listening &amp; observing &amp; takes notes.</p>	Describe structure of skin?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b><u>EPIDERMIS :-</u></b></p> <ul style="list-style-type: none"> <li>➤ It is composed of keratinized stratified squamous epithelial cells.</li> <li>➤ Type of cells – 4 types               <ul style="list-style-type: none"> <li>a.) Produce keratinocytes – 90%, 4-5 layer                   <ul style="list-style-type: none"> <li>1. Keratin is tough fibrous protein – protect from                       <ul style="list-style-type: none"> <li>– 1. Heat, 2. Microbes, 3. Chemical,</li> <li>4. Decrease water entry, 5. Foreign material.</li> </ul> </li> <li>2. Melanocytes – 8%                       <ul style="list-style-type: none"> <li>a.) produce melanine</li> <li>b.) provides color to skin</li> <li>c.) Protect skin from – Harmful UV rays.</li> </ul> </li> <li>3. Langerhans cells –                       <ul style="list-style-type: none"> <li>a.) Arises from red bone marrow &amp; migrates to epidermis.</li> </ul> </li> </ul> </li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>4. Morkel cells –</p> <p>a.) These cells are attached to sensory neuron with tactile disc.</p> <p>b.) It detects tactile (touch) sensation.</p> <p><b><u>LAYERS OF THE SKIN :-</u></b></p> <p>There are five layers of skin that are as follows:</p> <p>1. <b><u>Stratum germinativum or basale layer.</u></b></p> <p>a.) Simple row of simple cuboidal or columnar kertocytes.</p> <p>b.) Deepest layer – continuously undergo cell division to produce keratocytes , melano cytes, longerhans cells &amp; Morkel cells.</p> <p>2. <b><u>Stratum spinsum</u></b> – 8-10 row of</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>irregular shaped keratocytes.</p> <p>3. <b><u>Stratum lucidum</u></b> 3-5 row of flatted kerotocytes.</p> <p>4. <b><u>Stratum lucidum</u></b> – 3-5 row of clear,flat and dead keraticytes. only preset at the skin of –</p> <p>a.) Finger tips</p> <p>b.) Palm</p> <p>c.) Soles</p> <p>5. <b><u>Stratum corneum</u></b> – 25-30 rows of dead &amp; flat keratocytes contain mostly keratin.</p> <p><b><u>DERMIS :-</u></b></p> <ul style="list-style-type: none"> <li>➤ Second deeper part of skin.</li> <li>➤ Composed of connective tissue, blood vessels</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>nerves, glands &amp; hair follicles.</p> <p>Region of dermis – 2 regions.</p> <p>1- Papillary region – superficial 1/5 portion of dermis consist of aerolar connective tissue with elastic fibres &amp; dermal papilla for tactile function.</p> <p>2- reticular region –</p> <ul style="list-style-type: none"> <li>➤ Deeper 4/5 portion of dermis.</li> <li>➤ Consists of dense irregular connecting tissue.</li> <li>➤ It also contains adipose cells, hair follicles nerve and sebaceous gland &amp; sudoriferous gland.</li> </ul>		
2.	20 min	Enlist functions of skin.	<p><b><u>FUNCTIONS OF SKIN:-</u></b></p> <p>1. Thermo-regulation – by</p> <ul style="list-style-type: none"> <li>a. vasodilatation</li> <li>b. vaso constriction</li> </ul>	T: Enlisting functions of skin by using black board.	Enlist the functions of skin?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>2. Storage for blood or blood reservoir 87% of total blood flow in resting storage.</p> <p>3. Protection – Against –</p> <ul style="list-style-type: none"> <li>a. Abrasion</li> <li>b. Heat</li> <li>c. Chemicals</li> <li>d. Dehydration</li> <li>e. Prevent entry of water during shower &amp; swims.</li> <li>f. Sebum keep skin moist</li> <li>g. PH of perspiration retard growth bacteria.</li> <li>h. Microbes</li> <li>i. Pigment melanin protect against UV rays.</li> </ul>	S: Listening & observing & takes notes.	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>j. Langerhans cells alert immune system against microbes</p> <p>k. Macrophages of dermis are phagocytic against virus and bacteria.</p> <p>l. Filtration – Hair of nose filter dust particles.</p> <p>4. Excretion &amp; Absorption</p> <ul style="list-style-type: none"> <li>➤ Excretion – of salts CO<sub>2</sub> by sweat about 400ml of water evaporate daily through skin.</li> <li>➤ Absorption – It absorbs lipid soluble material like fat soluble Vitamin.-A, D, E &amp; K.</li> </ul> <p>Absorb certain drugs – topical ointment</p>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>&amp; Patches.</p> <p>5. Synthesis of vitamin –D – in the presence of sunlight. It synthesises Vitamin. –D and finally produces calcitriol. Calcitriol help in the absorption of calcium in blood in gastrointestinal tract into blood</p> <p>6. Sensation tactile sensation –</p> <ul style="list-style-type: none"> <li>a. Touch</li> <li>b. Pressure</li> <li>c. Vibration</li> <li>d. Tickling</li> </ul> <p>Thermal sensation –</p> <ul style="list-style-type: none"> <li>1.Heat &amp; Warmth</li> <li>2. Cold &amp; Coolness.</li> </ul>		

**SUMMARY : & EVALUATION (10 MIN):-** Today we discussed about the structure and functions of the skin. The integument or skin is the largest organ of the body, making up 16% of body weight, with a surface area of 1.8m<sup>2</sup>. It has several functions, the most important being to form a physical barrier to the environment, allowing and limiting the inward and outward passage of water, electrolytes and various substances while Providing protection against micro-organisms.

**ASSIGNMENT :-** Describe structure & Function of skin?

**EVALUATION :-** What are the layers of skin?, What is the function of skin?

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 361-373
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition, 1999, p.n. 124-129

## LESSON PLAN

Subject	: Bio – Science
Unit	: VIII The excretory system
Topic	: <b>Regulation of the body temperature</b> :
Group	GNM First Year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum demonstration
AV aids / instructional aids	: Black board, chalk, and PPT
Student Pre requisite	: Student should be knowledge about temperature, regulation of the body temperature and well oriented with the clinical thermometers.
General Objective	: At the end of the class the students will be able to gain knowledge regarding regulation of the body temperature and apply in clinical practices.
Specific Objectives : At the end of the class the students will be able to –	
1. Define body temperature.	
2. Define thermoregulation.	
3. Describe the heat balance, heat production and heat loss.	
4. Describe the mechanism of thermo regulation.	

**Review of previous class :**

- Ask question about formation of urine, fluid & electrolyte balance and patterns of elimination various excretory waste product.

**Introduction:**

- Ask the students if they know about lining in different geographical area of the world.
- Ask the student how they maintain their body temperature
- Brainstorm how they will prepare themselves to tour for Himalaya, mountain or desert of thar.
- At the end of the class the student will discuss about the process & regulation of the body temperature its importance daily life.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1	5min.	Define body temperature.	<b><u>DEFINITION OF BODY TEMPERATURE:-</u></b> Body temperature is a balance between heat gain and heat loss.	T: Define body temperature by using black board. S: Listening & observing & take notes.	Define body temperature ?
2.	5min.	Define thermoregulation.	<b>DEFINITION OF THERMOREGULATION :-</b> An ability of an organism to keep the body temperature within certain boundaries One aspect of homeostasis process Most enzymes are very sensitive Human average normal body temp. usually 37°C ( 98.6°F)	T: Define thermoregulation by using black board. S: Listening & observing & take notes.	Define thermoregulation?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3	20min.	Describe the heat balance, heat production and heat loss.	<p><b><u>HEAT BALANCE:-</u></b></p> <ul style="list-style-type: none"> <li>• Heat balance maintains the body temp</li> <li>• Balance between heat production &amp; heat loss (Heat Balance)</li> <li>• Heat Balance <ul style="list-style-type: none"> <li>• Heat production= Heat loss</li> </ul> </li> <li>• Heat production is called thermogenesis</li> <li>• Heat loss is called as thermolysis</li> </ul> <p><b><u>HEAT PRODUCTION (THERMOGENESIS):-</u></b></p> <ul style="list-style-type: none"> <li>• BMR</li> <li>• Specific Dynamic Action of food</li> <li>• Activity of skeletal muscle</li> </ul> <p>Shivering</p>	<p>T: Described the heat balance, heat production and heat loss. By using black board.</p> <p>S: Listening &amp; observing &amp; take notes.</p>	Describe the heat balance, heat production and heat loss?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Exercise</p> <ul style="list-style-type: none"> <li>• Chemical Thermo genesis Epinephrine &amp; Nor epinephrine Thyroxine</li> <li>• Brown Fat- Source of considerable heat production Abundant in infants</li> </ul> <p><b><u>HEAT LOSS (THERMOLYSIS):-</u></b></p> <ul style="list-style-type: none"> <li>• Radiation</li> <li>• Conduction</li> <li>• Convection</li> <li>• Evaporation</li> <li>• Perspiration</li> <li>• Respiration</li> <li>• Loss through urine &amp; feces</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	20min.	Describe the mechanism of thermo regulation.	<p><b><u>MECHENISM OF THERMOREGULATION:-</u></b></p> <ul style="list-style-type: none"> <li>• Temperature is regulated by nervous feedback mechanisms</li> <li>• Thermoregulatory center located in the <b>Hypothalamus</b></li> <li>• Thermoregulatory regulatory responses include <ul style="list-style-type: none"> <li>➤ Autonomic</li> </ul> </li> </ul>	<p>T: Described the mechanism of thermo regulation by using black board.</p> <p>S: Listening &amp; observing &amp; take notes.</p>	Describe the mechanism of thermo regulation?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Somatic</li> <li>➤ Endocrine</li> <li>➤ Behavioral changes</li> </ul> <p><b><u>FEEDBACK SYSTEM:-</u></b></p> <ul style="list-style-type: none"> <li>• Receptor <ul style="list-style-type: none"> <li>◦ Sensor that responds to changes (stimuli)</li> </ul> </li> <li>• 2) Control Center <ul style="list-style-type: none"> <li>◦ Sets range of values</li> <li>◦ Evaluates input and</li> <li>◦ Sends output</li> </ul> </li> <li>• 3) Effectors- <ul style="list-style-type: none"> <li>◦ Receives output from control centre</li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>◦ Produces a response</li> </ul> <p><b><u>BODY TEMPERATURE CONTROL SYSTEM:-</u></b></p> <ul style="list-style-type: none"> <li>• Hypothalamus               <ul style="list-style-type: none"> <li>◦ Acts as a thermostat</li> <li>◦ Receives nerve impulses from cutaneous thermoreceptors</li> <li>◦ Thermoreceptors      Cold &amp; Heat</li> </ul> </li> <li>• Hypothalamus- also has thermoreceptors called central thermoreceptors</li> <li>• These detect changes in blood temperature</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b><u>THERMOREGULATION BY SKIN:-</u></b></p> <p>The <b>dermis</b> is the layer of skin under the epidermis, and it's made up mostly of soft tissue such as collagen, elastin and fibrillin -- tissues that make your skin elastic and flexible yet strong and structurally firm. The dermis layer also contains blood vessels, hair follicles, nerve endings, oil glands and sweat glands. It's the latter of these that makes the dermis so important to heat regulation. The dermis controls body temperature through the production of sweat and the control of evaporation -- a process known as <b>insensible perspiration</b>. Basically, the sweat glands of the dermis secrete sweat, which then evaporates on the surface of the</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>skin. Because evaporation requires heat to work, the process of evaporating sweat actually helps to lower the temperature of our skin.</p> <p>The dermis also regulates temperature by controlling red blood cells. When the body is cold, the red blood cells of the dermis contract, which helps to retain internal body temperature. When the body is hot, the red blood cells expand, allowing heat to be released through the surface of the skin.</p> <p><b><u>THERMOREGULATORY REGULATORY RESPONSES:-</u></b></p> <ul style="list-style-type: none"> <li>• <b>Activated by Exposure to Cold:-</b> <ol style="list-style-type: none"> <li>1. <b>Shivering</b></li> <li>2. Increase voluntary activity</li> </ol> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			3. Increase TSH secretion 4. Increase Catecholamine's 5. <b>Vasoconstriction</b> 6. Horripilation 7. Curling up • <b>Activated by Exposure to Heat</b> 1. <b>Vasodilatation</b> 2. <b>Sweating</b> 3. Increase in Respiration 4. Anorexia 5. Apathy 6. Decrease TSH secretion		

**SUMMARY : & EVALUATION (10 MIN):-**

- Today we discussed about the body temperature, heat balance, heat production, heat loss and the mechanism of thermo regulation.

**ASSIGNMENT :-**

- Describe regulation of body temperature?

**EVALUATION :-**

- What is normal body temperature?
- What is temperature regulatory mechanism?

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 361-373
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n. 424-426

## **LESSON PLAN**

Subject	: Bio-Science
Unit	: Endocrine system
Topic	: <b>Structure and Functions of the Pituitary Gland.</b>
Group	: GNM First year.
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Discussion.
AV aids / instructional aid	: Black Board, Chalk and PPT
Student Pre requisite	: student should be well oriented about the chart, model and specimen related to brain and pituitary gland.

General Objective : At the end of the lesson students will be able to understand structure and function of the Pituitary gland.

Specific Objectives: After completing this lesson students will be able to –

1. Describe the structure of the pituitary gland.
2. Describe parts of the pituitary gland.
3. Describe the hormone secreted by the pituitary gland and their function.

Review of previous class: In previous classes we study about the brain and its different parts and function.

### **Introduction:**

As all of you are well known that the principle of our GNMTC play a pivotal role in performing multiple tasks at a glance likewise one thing present in our body that govern most of activity in our body and called master gland called Pituitary Gland.



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	15min	Describe the structure of the pituitary gland.	<p><b><u>STRUCTURE OF THE PITUITARY GLAND :-</u></b></p> <ul style="list-style-type: none"> <li>➤ It is a major endocrine and pea-sized gland, lies in the hypophyseal fossa of the sphenoid bone below the hypothalamus and surrounded by a small bony cavity (sella turcia).</li> <li>➤ It is also called master gland because it controls several of the other endocrine glands.</li> <li>➤ The pituitary gland and the hypothalamus act as a unit, regulating the activity of most of the other endocrine glands.</li> <li>➤ It is pea shaped. Weight about 500 mg. and consist of two main parts that originate from different types of cells.</li> </ul>	Teacher Described the structure of the pituitary gland by using black board and PPT and student listening, observing attentively and takes notes.	Describe the structure of the pituitary gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	20min	Describe parts of the pituitary gland.	<p><b><u>PARTS OF THE PITUITARY GLAND:-</u></b></p> <p>There are two part of the pituitary glands that are as follows:-</p> <p><b><u>1. Anterior pituitary – (adenohypophysis):-</u></b></p> <ul style="list-style-type: none"> <li>➤ The anterior lobe is derived from oral ectoderm and is composed of glandular epithelium.</li> <li>➤ Communication below the hypothalamus and anterior pituitary occurs through releasing and inhibiting hormones produced by the hypothalamus and delivered to the anterior pituitary via a portal network of capillaries.</li> </ul>	Teacher Described parts of the pituitary gland by using black board and PPT and student listening, observing attentively and takes notes.	Describe parts of the pituitary gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>➤ It consist of three divisions –</p> <ul style="list-style-type: none"> <li>• Pars distalis.</li> <li>• Pars tuberalis</li> <li>• Pars Inter media</li> </ul> <p><b>2. <u>Posterior pituitary (neurohypophysis)</u></b></p> <p>➤ Communication between the hypothalamus and the posterior pituitary occurs through neurosecretory cells.</p> <p>➤ Hormones produced by the neurosecretory cells are packaged in vesicles and transported through the axon and stored in the axon terminals that lie in the posterior pituitary.</p> <p>➤ When the neurosecretory cells are stimulated the action potential generated</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>triggers the release of the stored hormones from the axon terminals to a capillary network within the posterior pituitary.</p> <ul style="list-style-type: none"> <li>➤ Blood is supplied by branches from the internal carotid artery</li> <li>1. The anterior lobe is supplied indirectly by hypothalamus.</li> <li>2. The posterior lobe is supplied directly by a branch from the carotid artery.</li> <li>➤ This network of blood vessels in the gland is called “Pituitary portal”.</li> <li>➤ Venous blood from both lobes containing hormones leaves the gland in short veins that enter in the venous sinus between the layers of dura mater.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	15min	Describe the hormone secreted by the pituitary gland and their function.	<p><b><u>HORMONE SECRETED BY ANTERIOR LOBE OF PITUITARY( ADENOHYPOPHYSIS):-</u></b></p> <p><b>Adenohypophysis –</b></p> <ul style="list-style-type: none"> <li>➤ The anterior pituitary lobe receives releasing hormones from the hypothalamus via pituitary portal system. These hormones from the hypothalamus cause release of the respective hormones from the pituitary.</li> <li>➤ The control of release of hormones from the pituitary is via negative feedback from the target gland. Ex. Thyroid releasing hormones (TRH) from the hypothalamus stimulates the release of TSH from anterior pituitary.</li> </ul> <p>The TSH stimulates the release of thyroid hormones</p>	Teacher Described the hormone secreted by the pituitary gland and their function by using black board and PPT and student listening, observing attentively and takes notes.	Describe the hormone secreted by the pituitary gland and their function?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>from the thyroid gland. The thyroid hormones the cause negative feedback suppressing the release of TRH and TSH.</p> <p>➤ Releasing hormones from the hypothalamus are following –</p> <ol style="list-style-type: none"> <li>1. Growth hormone releasing hormones (GHRH)</li> <li>2. Thyrotropin – releasing hormones (TRH)</li> <li>3. Corticotropin – releasing hormones (CRH)</li> <li>4. Prolactin releasing hormones (PRH)</li> <li>5. Gonadotropin releasing hormones (GnRH)</li> <li>6. Dopamine, also called prolactin</li> </ol>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>inhibiting factor (PIF).</p> <p>➤ The anterior pituitary secretes –</p> <ol style="list-style-type: none"> <li>1. Growth Hormones – Regulates metabolism, Promotes tissue growth especially of bones and muscles.</li> <li>2. Thyroid stimulating hormones – (TSH) Stimulate growth and activity of thyroid. Simulated secretion of progesterone by the corpus luteum (Females)</li> </ol> <p><b><u>HORMONE SECRETED BY POSTERIOR LOBE OF PITUITARY AND THEIR FUNCTION (NEURO HYPOPYSIS):-</u></b></p> <p>➤ The posterior lobe of the pituitary gland is composed of secretory cells called pituicytes the</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>hormones released by the posterior lobe are oxytocin and ADH or vasopressin are synthesised by the cells of the hypothalamus.</p> <ol style="list-style-type: none"> <li>1. Oxytocin – <ul style="list-style-type: none"> <li>➤ Oxytocin promotes contraction of uterine muscles during the birth of baby and contraction of myoepithelial cells of the locating breast for release of milk during breast feeding.</li> </ul> </li> <li>2. Anti diuretic hormones –(ADH) <ul style="list-style-type: none"> <li>➤ It increases the permeability to water of the distal convoluted tubule and collecting duct of the nephron of the kidney as result the reabsorption of water from the glomerular filter is increased gland secretion of T3 and T4.</li> </ul> </li> </ol>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>3. Adreno cortico tropic hormones -(ACTH) Stimulates the adrenal cortex to secrete glucocorticoids.</p> <p>4. Prolactin – (Luteotropic hormones) ➤ Stimulates growth of breast tissue and milk production. ➤ Sucking stimulates the prolactin secretion it's not depend on hypothalamic factor.</p> <p>5. Follicle stimulating hormones (FSH) ➤ Stimulates production of sperm in the testes.(males) ➤ Stimulates secretion of oestrogen by the ovaries, maturation of ovarian follicles and ovulation. (Female)</p> <p>6. Luteinizing hormones – (LH)</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Stimulates secretion of testosterone by the testes. (Males) in – (Luteotropic hormones)</p> <ul style="list-style-type: none"> <li>➤ Stimulates growth of breast tissue and milk production.</li> <li>➤ Sucking stimulates the prolactin secretion it's not depend on hypothalamic factor.</li> </ul> <p>5. Follicle stimulating hormones (FSH)</p> <ul style="list-style-type: none"> <li>➤ Stimulates production of sperm in the testes.(males)</li> <li>➤ Stimulates secretion of oestrogen by the ovaries, maturation of ovarian follicles and ovulation. (Female)</li> </ul> <p>7. Luteinizing hormones – (LH)</p> <p>Stimulates secretion of testosterone by the testes. (Males)</p>		

**SUMMARY : & EVALUATION (10 MIN):-**

- Today, we have discussed about the structure of the pituitary gland, parts of the pituitary gland. And the hormone secreted by the pituitary gland and their function.

**ASSIGNMENT :**

- Describe structure of the pituitary gland and actions of the hormones secreted by the pituitary gland?

**EVALUATION :**

- What is the hormone secreted by the pituitary gland?

**BIBLIOGRAPHY :**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 217-221
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition, 1999, p.n. 509-520

## **LESSION PLAN**

Subject	: -Bio-Science
Unit	: - Endocrine System
Topic	: - <b>Structure and Function of the Thyroid Gland</b>
Group	: -G.N.M.Fisrt year
Place	: - Class room
Date & Time	:-
Duration	: - 60min.
Teaching Method	:-Lecture cum Discussion
AV Aids	: - Black Board, chalk and PPT

**Students Pre requisite** : - The students have an understanding about human behaviour and its importance in nursing.

**General Objective:** -At the end of the unit, the student is able to; understand structure and function of the thyroid gland.

**Specific Objective:** - At the end of the class students will be able to

1. Describe the position of the thyroid gland and its related structure.
2. Describe the microscopic structure of the thyroid gland.
3. Describe the hormone T3 and T4 and regulation of blood level.
4. Explain the actions of the thyroid hormone.

Review of Previous Class:- student should be well oriented about the model, chart and specimen related to thyroid gland and its f.

**Introduction:** - The thyroid gland, or simply the thyroid, is one of the largest endocrine glands in the body, and consists of two connected lobes. It is found in the anterior neck, below the laryngeal prominence (Adam's apple). The thyroid gland controls rate of use of energy sources, protein synthesis, and controls the body's sensitivity to other hormones. It participates in these processes by producing thyroid hormones, the principal ones being thyroxine ( $T_4$ ) and triiodothyronine ( $T_3$ ), which is more active.

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1	10 min	Describe the position of the thyroid gland and its related structure.	<p><b><u>POSITION OF THE THYROID GLAND AND RELATED STRUCTURE:-</u></b></p> <ul style="list-style-type: none"> <li>➤ The thyroid gland is the largest endocrine gland situated in front of the larynx and trachea at the level of the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> cervical and 1<sup>st</sup> thoracic vertebrae.</li> <li>➤ It is a highly vascular gland the weigh about 60 grams in adults and is surrounded by fibrous capsule.</li> <li>➤ It is a butterfly in shape consisting of two lobes one on each side of the trachea.</li> <li>➤ The lobes are joined by a narrow isthmus lying in the front of trachea.</li> </ul>	<p>T. - Described the position of the thyroid gland and its related structure with the help of Black Board and PPT</p> <p>S- Listening, observing attentively and takes notes.</p>	Describe the position of the thyroid gland and its related structure?

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
2	10min	Describe the microscopic structure of the thyroid gland.	<ul style="list-style-type: none"> <li>➤ The lobes are roughly cone shaped about 5cm long and 3cm wide</li> <li>➤ The arterial blood supply to the gland is through the superior and inferior thyroid arteries. The superior thyroid artery is a branch of the external carotid artery and inferior thyroid artery is branch of sub-clavian artery.</li> <li>➤ The venous return is by the thyroid veins which drain into the internal jugular veins.</li> </ul> <p><b><u>MICROSCOPIC STRUCTURE OF THE THYROID GLAND:-</u></b></p>	T.- Described the microscopic structure of the	Explain the microscopic structure of the

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<ul style="list-style-type: none"> <li>The thyroid is composed of spherical follicles from cuboidal epithelium that selectively absorb iodine from the blood for production of thyroid hormones and also for storage of iodine is thyroglobulin (colloid)</li> <li><b>Follicular cells</b> –The follicles are surrounded by single layer of follicular cells which secrete T3 and T4. When the gland is not secreting T3 and T4 the epithelial cells range from low columnar to cuboidal cells become tall columnar cells.</li> <li><b>Para follicular cells</b>—scattered among</li> </ul>	thyroid gland with the help of Black Board and PPT S- Listening, observing attentively and takes notes.	thyroid gland?



S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
3.	15min	Describe the hormone T3 and T4 and regulation of blood level.	<p>Follicular cells and in spaces between the spherical follicles are another type of thyroid cells parafollicular cells also called “C” cells which secrete calcitonin.</p> <p><b><u>DESCRIBE THE HORMONE T3 AND T4 AND REGULATION OF BLOOD LEVEL :-</u></b></p> <ul style="list-style-type: none"> <li>Thyroid hormones are synthesised by thyroglobulin in the follicular cells the major constituent of colloid.</li> <li>Iodine is essential for the formation of the T3 and. The thyroid gland selectively takes up iodine from the</li> </ul>	<p>T. - Described the hormone T3 and T4 and regulation of blood level. with the help of Black Board and PPT</p> <p>S- Listening,</p>	Describe the hormone T3 and T4 and regulation of blood level?

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p>blood a process called iodine trapping.</p> <ul style="list-style-type: none"> <li>▪ The release of T3 and T4 into the blood is stimulated by TSH from the anterior pituitary.</li> <li>▪ Secretion of TSH is stimulated by thyrotropin releasing hormone (TRH) from the hypothalamus.</li> <li>▪ Secretion of TRH is stimulated by exercise, stress. Malnutrition, low plasma glucose level and sleep</li> <li>▪ Secretion of TSH depends on plasma levels of T3 and T4 and regulated by negative feedback mechanism.</li> <li>▪ Through negative feedback mechanism increased levels of T3</li> </ul>	<p>observing attentively and takes notes.</p>	

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
4.	15min	Explain the actions of the thyroid hormone.	<p>and decrease TSH secretion causing proliferation of thyroid gland and enlargement of the gland (goitre).</p> <ul style="list-style-type: none"> <li>▪ T4 (thyroxine) is much more abundant. However it is less potent than T3 (tri- iodothyronine) which is more physiologically important most T4 is converted into T3 inside target cells.</li> </ul> <p><b><u>ACTIONS OF THE THYROID HORMONE:-</u></b></p> <ul style="list-style-type: none"> <li>❖ Thyroid hormones – (T3 and T4) –they enter the cell nucleus and regulate gene expression, i.e. they increase or decrease protein synthesis.</li> <li>❖ They enhance the effect of other hormones</li> </ul>	T. - Explained the actions of the thyroid hormone with the help of Black Board and	Explain the actions of the thyroid hormone?

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p>e.g. adrenaline and Noradrenaline.</p> <ul style="list-style-type: none"> <li>❖ T3 and T4 affect most cells of the body by : (               <ul style="list-style-type: none"> <li>i) increasing the basal metabolic rate and heat production.</li> <li>❖ (ii) Regulating metabolism of proteins carbohydrates and fats.</li> <li>❖ They are essential for normal growth and development, especially of the skeleton and nervous system.</li> <li>❖ Most other organs and systems are also influenced by thyroid hormones.</li> <li>❖ The thyroid hormones regulate vital body functions including :- Breathing Heart rate Body temperature</li> </ul> </li> </ul>	<p>PPT</p> <p>S- Listening, observing attentively and takes notes.</p>	

S.N o.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p>Skeletal muscles</p> <p>Skin, digestive, reproductive and nervous system.</p> <p>Menstrual cycles</p> <p>Cholesterol levels</p> <p><b><u>CALCITONIN</u></b>:-This is secreted by the parafollicular or C- cells in the thyroid gland. Calcitonin lowers raised blood calcium levels by-</p> <p>(i) Bone cells promoting their storage of calcium.</p> <p>(ii) Kidney tubules inhibiting the re-absorption of calcium.</p>		

**ASSIGNMENT** :- Describe the Structure and functions of the thyroid gland?

**EVALUATION** :-

- What is thyroid gland?
- Which hormone is secreted by thyroid gland/
- What is the function of thyroid gland?
- Unit test 50 marks once unit IX is completed.

**BIBLIOGRAPHY** :-

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 221-223
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition,1999, p.n.520-525

## **LESSON PLAN**

Subject	: Bio-Science
Unit	: Endocrine system
Topic	: <b>Structure and Functions of the Parathyroid Gland.</b>
Group	: GNM First year.
Place	: Class - Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Discussion.
AV aids / instructional aids	: Chalk -Board, Chart and PPT
Student Pre requisite	: student have well oriented about the chart, models and specimens of parathyroid gland.
General Objective	: At the end of the lesson students will be able to understand structure and function of the Parathyroid gland.
Specific Objectives	: After completing this lesson students will be able to –

1. Define parathyroid gland.
2. Describe the position and structure of the parathyroid gland
3. Describe microscopic structure of the parathyroid gland.
4. Enumerate function of the parathyroid gland.

Review of previous: in the last class we studied about the thyroid gland and pituitary gland related question was asked to the student.

**Introduction:** Learn what parathyroid glands are, where the parathyroid glands are located, and how the parathyroid glands control our calcium levels. Hyperparathyroidism is introduced. Regulation of blood calcium is discussed along with the meaning of high blood calcium.



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Define parathyroid gland.	<b><u>DEFINITION OF THYROID GLAND:-</u></b> <ul style="list-style-type: none"> <li>➤ The parathyroid glands are four tiny glands located in the neck that control the body's calcium levels.</li> <li>➤ Each gland is about the size of a grain of rice [weighs approximately 30 mg and 3-4 mm in diameter.]</li> </ul>	Teacher defined Parathyroid gland with the help of chalk board and student listens attentively and takes notes.	Define parathyroid gland ?
2.	15 min	Describe the position and structure of the parathyroid gland.	<b><u>POSITION AND STRUCTURE OF THE PARATHYROID GLAND :-</u></b> <ul style="list-style-type: none"> <li>➤ The parathyroid glands are two pairs of glands usually positioned behind the left and right of the thyroid.</li> </ul>	T. - Described the position and structure of the parathyroid gland with the	Describe the structure of the parathyroid gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Each gland is a yellowish – brown flat ovoid that resembles a lentil seed, usually about 6 mm long and 3–4 mm wide and 1–2 mm anteroposteriorly.</li> <li>➤ There are typically four parathyroid glands.</li> <li>➤ The two parathyroid glands on each side which are located upper are called superior parathyroid glands, while the lower are called the inferior parathyroid glands.</li> <li>➤ Healthy parathyroid glands generally weight about 30 mg in men and 35 mg in women.</li> </ul>	help of Black Board and PPT S- Listening, observing attentively and takes notes.	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ These glands are not visible or able to be felt during examination of the neck.</li> <li>➤ The blood supply, drainage and lymphatic drainage of the parathyroid glands correspond to the thyroid overlying gland.</li> <li>➤ The superior parathyroid glands receive their blood from the inferior thyroid arteries.</li> <li>➤ The inferior parathyroid glands receive a variable blood supply from either the ascending branch of the inferior thyroid arteries or the thyroid ima artery.</li> <li>➤ Each parathyroid vein drains into the superior, middle and inferior.</li> </ul>	<p>T. - Described microscopic structure of the parathyroid gland with the help of Black Board and PPT</p> <p>S- Listening, observing attentively and takes notes.</p>	Describe microscopic structure of the parathyroid gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	15 min	Describe microscopic structure of the parathyroid gland.	<p><b><u>MICROSCOPIC STRUCTURE (HISTOLOGY) OF THE PARATHYROID GLAND:-</u></b></p> <ul style="list-style-type: none"> <li>➤ The parathyroid glands are named for their proximity to the thyroid but serve a completely different role than the thyroid gland.</li> <li>➤ Two unique types of cells are present in the parathyroid gland.               <ol style="list-style-type: none"> <li>1. <b>Chief cells</b> – which synthesis and release parathyroid hormones. These cells are small, and appear dark when loaded with parathyroid hormone and clear when it has been secreted or in their resting state.</li> </ol> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15 min	Enumerate function of the parathyroid gland.	<p>2. <b>Oxyphil cells</b> –</p> <ul style="list-style-type: none"> <li>➤ Which are lighter in appearance and increase in number with age, have an unknown function?</li> </ul> <p><b><u>Function of para thyroid hormone:-</u></b></p> <ul style="list-style-type: none"> <li>➤ Parathyroid gland secretes the parathyroid hormone (PTH or parathormone) is a small protein that takes part in the control of calcium and phosphate homeostasis as well as bone physiology.</li> </ul> <p>1. Secretion of PTH is regulated by the blood level of ionised calcium when their falls</p>	<p>T. - Enumerates function of the parathyroid gland with the help of Black Board and PPT</p> <p>S- Listening, observing attentively and takes notes.</p>	Enumerate function of the parathyroid gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>secretion of PTH is increase.</p> <p>2. Parathormone hormone has effects antagonistic to those of calcitonin.</p> <p>3. PTH also increase gastrointestinal calcium absorption by activating vitamin D, and promotes calcium conservation (reabsorption) by the kidney.</p>		

**SUMMARY : & EVALUATION (10 MIN):-**

- Today, we discussed about structure and functions of the parathyroid gland.

After completing the lesson we have discussed about whole topic and satisfied answer given by the students.

**ASSIGNMENT :-**

Describe Structure and functions of the parathyroid gland?

**EVALUATION :-**

- Define parathyroid gland?
- What hormone is secreted by the parathyroid gland?
- Unit test 50 marks once unit IX is completed.

**BIBLIOGRAPHY :-**

1. Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness” Churchill Livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 223-224
2. Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition, 1999, p.n. 525-529

# LESSON PLAN

Subject	: Bio – Science
Unit	: IX
Topic	: <b>Structure and Functions of Adrenal Glands</b>
Group	: GNM First year
Place	: Class – Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion
AV aids / instructional aids	: PPt., Chalk-Board, & Chart
<b>Student Pre requisite</b>	: The student should be able to gain knowledge of structure and functions of adrenal glands.
<b>General Objective</b>	: At the end of the class the student will be able to gain knowledge of structure and functions of adrenal glands and will be able to apply this knowledge in their clinical practice and day to day life.
<b>Specific Objectives</b>	: At the end of the class student will be able to – <ul style="list-style-type: none"><li>➤ Discuss about the location and position of adrenal gland.</li><li>➤ Explain blood supply of adrenal gland.</li><li>➤ Describe structure of adrenal glands.</li><li>➤ Describe functions of adrenal hormones.</li><li>➤ Enumerate various disorders related to adrenal glands</li></ul>



**Review of previous class :** Ask the question about student to regarding knowledge of adrenal gland, endocrine system, Importance of adrenal glands & structure and functions of adrenal glands.

**Introduction: 2min**

- Ask students about adrenal gland.
- Tell students about endocrine system.
- brain storm what they think how importance the proper functioning of adrenal glands
- At the end of session students must discuss the structure and functions of adrenal glands.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Discuss about adrenal gland position and location.	<b>ADRENAL GLAND:-</b> <b>POSITION AND SIZE:-</b> <ul style="list-style-type: none"> <li>➤ The two adrenal (suprarenal) glands are situated on upper pole of each kidney enclosed within the capsule called renal fascia. They are about 4 cm long and 3cm thick. Weight about 3.5 to 5 gm.</li> </ul>	T:- explaining the position and size of adrenal gland with ppt and black board. S:- listening and takes down notes	Where the adrenal gland situated?
2.	2 min	Explain blood supply of adrenal gland	<b>BLOOD SUPPLY:-</b> <ul style="list-style-type: none"> <li>➤ The arterial blood supply is by branches from the abdominal aorta and renal arteries.</li> <li>➤ The venous return is by suprarenal veins. The right gland drains into inferior vena cava and the left into the left renal vein.</li> </ul>	T:- discuss blood supply of adrenal gland with ppt and black board. S:- listening and takes down notes	Enumerate the arterial and venous blood supply of adrenal gland?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	Describe the structure of adrenal gland.	<p><b>STRUCTURE –</b></p> <ul style="list-style-type: none"> <li>➤ The glands are composed of two parts which have different structures and functions the</li> <li>A. Outer part of CORTEX and</li> <li>B. Inner part the MEDULLA.</li> </ul> <p>The adrenal cortex is essential to life but the medulla is not.</p> <p><b>A. ADRENAL CORTEX –</b></p> <p>Adrenal cortex is subdivided in to 3 zones, each of which secretes different hormones –</p> <ol style="list-style-type: none"> <li>1. Outer zone called zona glomerulosa</li> <li>2. Middle zone called zona fasciculate</li> <li>3. Inner zone called zona reticularis</li> </ol>	<p>T:- explaining the structure of adrenal gland with ppt and black board, chart.</p> <p>S:- listening and takes down notes and make diagram</p>	Explain the structure of adrenal gland with diagram?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>1. <b>Zona glomerulosa</b> – This is the outer zone that lies just below the capsule, and constitutes about 15% of glands it cells closely packed and arranged in spherical duster and arched columns. They secrete hormones called <b>mineralocorticoids</b> and effect mineral homeostasis.</p> <p>2. <b>Zona fasciculata</b> – This middle zone is widest of the three zone. If constitutes about 50% of the glands. The cells are arranged in long straight column. The cells of this zone secrete mainly <b>glucocorticoids</b>.</p> <p>3. <b>Zona reticularis</b> – This inner zone constitutes about 7% of the gland. The cells are arranged in branching cords. They synthesize small amount of week <b>androgens or sex hormones</b>. Steroid hormone that have masculinising effect.</p> <p>The cells of zona fascicular and zona</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>reticulate contain ascorbic nervous system. It development from the same embryonic tissue as all other synphathetic ganglia but its cells lack axon and form cluster around large blood vessels. The cells of adrenal medulla secrete hormones, rather than a neurotransmitter.</p> <p><b>B. ADRENAL MEDULLA:-</b></p> <ul style="list-style-type: none"> <li>The medulla is inner most part of adrenal gland surrounded by cortex. It consists hormone producing cells chromaffin cells. These cells receive direct innervations from preganglionic neuron of the symapathatic division of autonomic nervous system and develops from the same embryonic tissue as all other sympathetic post ganglionic cells which are specialised to secrete hormone (epinephrine and norepinephrine) rather than a neurotransmitter (norepinephrine).</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	25 min	Describe functions of adrenal gland.	<p><b>FUNCTION OF ADRENAL CORTEX AND ADRENAL MEDULLA:</b></p> <p><b>A. HORMONES OF ADRENAL CORTEX</b></p> <p>The adrenal cortex produce steroid hormone from cholesterol as discussed above. They are collectively called adrenocorticoids or corticosteroids.</p> <p>1. <b>Mineralocorticoids</b> – secreted by zona glomerulosa. Aldosterone is major mineralocorticoids. It maintains water and electrolyte balance. It increases sodium and water reabsorption in kidney tubules. At the same time increases excretion of <math>K^+</math> in the urine. It regulates homeostasis of two mineral ions <math>Na^+</math> ion and <math>K^+</math> ions and help to adjust blood pressure and blood volume. Aldosterone also promotes excretions of <math>H^+</math> in the urine, this removal of acid from the</p>	<p>T:- discusses the function of adrenal gland hormone with ppt and black board.</p> <p>S:- listening and takes down notes and make diagram</p>	What are the functions of adrenal gland?

			<p>body can help prevent acidosis (blood pH below 7.35)</p> <p>2. <b>Glucocorticoids</b> – They regulate metabolism and resistance to stress. They include cortisol (hydrocortisone) , corticosterone, and cortisone. Out of these three, cortisol is the most abundant and responsible for about 95% of glucocorticoid activity. Collectively called steroids. Controlled by ACTH from anterior pituitary gland. Cortisol secretion peak between 4 am to 8 am and being lowest between midnight and 3am.</p> <ul style="list-style-type: none"> <li>• Glucocorticoid secretion increases in response to stress including infection and surgery.</li> <li>• Glucocorticoids have following functions and effects:- <ul style="list-style-type: none"> <li>- Metabolism</li> <li>- Formation of glucose:- Glycogenolysis, Gluconeogenesis, Lipolysis</li> <li>- Protein metabolism</li> <li>- Fat metabolims</li> <li>- Resistance to stress</li> </ul> </li> </ul>		
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S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>3. <b>Sex hormones or Gonadocorticoids (Androgens)</b> – in both sexes, the adrenal cortex secretes small amount of weak androgens. Male sex hormone that exert masculinising effects. The major androgen secreted by the adrenal gland is dehydroepiandrosterone or DHEA. In females , however adrenal androgen, play important roles. The promote Libido and and sexual behaviour.</p> <p><b>B. HORMONES OF ADRENAL MEDULLA:-</b></p> <p>➤ The medulla of adrenal glands secrets two hormones derived from the amino acid tyrosine norepinephrine (noradrenaline) 20% and epinephrine (adrenaline) 80%. Both hormones are sympathomimetic, their effects mimic those brought about by the sympathetic</p>		



			<p>division of the ANS.</p> <p>➤ Adrenaline and some noradrenaline are released into the blood from the adrenal medulla during stimulation of sympathetic nervous system. Structurally both are very similar and explain similar effects. Together they potentiate FIGHT AND FLIGHT response by:-</p> <ul style="list-style-type: none"> <li>- Increasing heart rate</li> <li>- Increasing blood pressure (By increase heart rate and force contraction and constricting blood vessels)</li> <li>- Diverting blood to essential organs, including the heart, brain and muscles by dilating their blood vessels.</li> <li>- Increasing metabolic rate</li> <li>- Dilating the pupil.</li> <li>- Dilate airways to the lungs</li> <li>- Decrease the rate of digestion</li> <li>- Increase blood glucose level</li> </ul>		
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			<p>1. Norepinephrine (Nordrenaline) – It regulates the blood pressure under normal condition by causing constriction of essentially all the blood vessels of the body. It causes increased activity of the heart inhibition of GT tract. Dilation of the pupils of the eyes, dilation of airway to the lungs, and increase in blood level of glucose fatty acids.</p> <p>2. Epinephrine (adrenaline) – It is secreted at the time of emergency. It cause almost the same effect as those caused by norepinephrine in causing a greater effect on cardiac activity causes only weak constriction of blood vessels, and has several times greater , metabolic effect.</p>		
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S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5	2 min	Enumerate various disorders related to adrenal glands	<b>DISORDERS OF ADRENAL CORTEX:-</b> <ol style="list-style-type: none"> <li>1. Cushing's syndrome:- hypersecretion of glucocorticoids</li> <li>2. Addison's disease:- hyposecretion of glucocorticoids and aldosterone</li> <li>3. Congenital or acquired adrenal hyperplasia and adrenal tumor :- phaeochromocytoma, neuroblastoma</li> </ol>	<b>T:-</b> explaining the disorders and diseases with ppt <b>S:-</b> listening attentively and taking down notes	List out the disorders and diseases occurs in adrenal glands ?

**Summary : & Evaluation (3min)**

In this chapter we have discussed about the structure & functions of adrenal glands. It has two major parts adrenal cortex and medulla. This gland secretes various hormones which plays vital role in our body and few of them are essential for life.

**Assignment : 1min**

- Describe the structure and functions of adrenal glands.

**Evaluation :**

- Explain the functions of various hormones secreted by adrenal gland.

**Bibliography :**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 224-226
- P.V. publication – a text book of Anatomy & Physiology.
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 527-532

# **LESSON PLAN**

Subject	: Anatomy physiology And Microbiology
Unit	:IX
Topic	: <b>Structure and functions of pancreas.</b>
Group	: GNM First Year
Place	: Class – Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion.
AV aids / instructional aids	: Black board-chalk, chart and Power point
Student Pre requisite	: The student should be able to knowledge of structure and functions of pancreas.
General Objective	: At the end of class the student will be able to gain knowledge of structure and function of pancreas.
<b>Specific Objectives</b>	<b>: At the end of class the students will be able to –</b> <ul style="list-style-type: none"><li>➤ Introduction about pancreas.</li><li>➤ Structure of pancreas (exocrine and endocrine).</li><li>➤ Explain exocrine pancreas and endocrine pancreas.</li><li>➤ Explain functions of pancreas.</li><li>➤ Enumerate disease and disorders related to pancreas</li></ul>

**Review of previous class :** Ask the question about student to regarding knowledge of pancreas, importance the Hormones of pancreas, discuss the structure of pancreas.

**Introduction:**

- Ask students about pancreas.
- Tell a story a person undergoing DM treatment.
- Brain storm what they think how importance the hormones of pancreas.
- At the end of session student must discuss the structure of pancreas.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Introduce pancreas.	<p><b>INTRODUCTION –</b></p> <p>➤ The pancreas is a glandular retroperitoneal organ in the digestive system and endocrine system of vertebrates. In human it is located in the abdominal cavity behind the stomach. It is an endocrine gland producing served important hormones including insulin, glucagon, somatostatin and pancreatic polypeptide which circulates in the blood. The pancreas is also a digestive organ, secreting pancreating juice containing digestive enzyme that assist digestive and absorption of nutrients in to the small intestine. These enzymes help to further breakdown the carbohydrates, proteins and lipids in the chyme.</p>	<p>T:- introducing pancreas with ppt and black board. chart</p> <p>S:- listening and takes down notes</p>	What do you mean by pancreas?
2.	10 min	Describe structure of pancreas.	<p><b>STRUCTURE –</b></p> <p>➤ The pancreas is an endocrine organ that lies in the upper left part of the abdomen. It is found behind the stomach with the head of the pancreas. Surrounding by the duodenum. The pancreas is about 12- 15 cm long and 2.5 cm thick.</p>	<p>T:- explaining the structure of pancreas with ppt and black board, chart</p> <p>S:- listening and takes down notes</p>	Explain the structure of pancreas with a diagram?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ It is divided in to broad head, body and narrow tail part. it is pale grey in color and weighing about 60 grams, situated in epigastric and left hypochondriac region of the abdominal cavity.</li> <li>➤ Anatomically, the pancreas is divided into a head which rests with in the concavity of the duodenum a body lying behind the base of the stomach and a fail which ends the spleen.</li> <li>➤ The neck of the pancreas lies between the body and head and lies anterior to the superior mesenteric artery and vein.</li> <li>➤ The pancreas is a secretary structure with an internal hormonal role (endocrine) and an external digestive role (exocrine). It has two main ducts. The main pancreatic duct and the accessory pancreatic duct. These drain enzymes through the hepato-pancreatic in to duodenum.</li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3	10 min	Explain exocrine & endocrine structure of pancreas (internal structure)	<b>THE EXOCRINE PANCREAS –</b> <ul style="list-style-type: none"> <li>➤ This consists of a large number of lobules made up of small acini, the walls of which consist of secretory cells. (99% of total pancreas)</li> <li>➤ Each lobule is drained by a tiny duct and these unite even finally to form the pancreatic duct (duct of wirsung) , which extends along the whole length of the glands and open into duodenum.</li> <li>➤ Just before entering the duodenum The pancreatic ducts joins the common bile duct to form the hepatopancreatic ampulla (ampulla of vater) .</li> <li>➤ The duodenal opening of the ampulla is controlled by the hapatopancreatic sphincter of oddi at the duodenal papilla.</li> <li>➤ The exocrine pancreas produce pancreatic juice which plays a vital role in digestion of food. (1200 -1500ml per day). It is clear, colorless liquid. The juice consists of:- <ul style="list-style-type: none"> <li>- Water</li> </ul> </li> </ul>	T:- explaining the structure of internal structure of pancreas (exocrine and endocrine pancreas) with ppt and black board, chart S:- listening and takes down notes and making diagram	Describe the internal structure of pancreas including exocrine and endocrine pancreas?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- Mineral salts</li> <li>- Enzyme:- amylase, lipase, nuclease that digest DNA and RNA</li> <li>- Inactive enzyme precursors including:- trypsinogen and chymotrypsinogen</li> <li>- Carboxypeptidase</li> <li>- Elastase</li> <li>- Ribonuclease and deoxyribonuclease</li> </ul> <p>➤ The pancreatic juice is basic or alkaline in nature pH 8 because it contains significant quantities of bicarbonate ions, which are basic or alkaline.</p> <p><b>THE ENDOCRINE PANCREAS:-</b></p> <p>It consists of group of specialised cells called pancreatic islets or islets of Langerhans, scattered throughout the gland. (1% of total pancreas)</p> <p>The islets have no ducts so the hormones diffuse directly into the blood.</p> <p>The endocrine pancreas secretes the hormones insulin, glucagon and somatostatin, which are principally concerned with control of blood glucose level.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>➤ There are three main types of cells in the pancreatic islets:-</p> <p>a. A cells/ Alpha cells (<math>\alpha</math>) 20% of pancreatic islets :- secretes glucagon</p> <p>b. B cells / Beta cells (<math>\beta</math>) 70% of pancreatic islets:- secretes insulin</p> <p>c. D cells / Delta cells (<math>\delta</math>) 5% of pancreatic islets :- secrets somatostatin (identical to growth hormone secreted by hypothalamus.</p> <p>d. F cells :- secrets pancreatic polypeptides</p> <p><b>BLOOD SUPPLY –</b></p> <p>The splenic and mesenteric arteries supply the pancreas and venous drainage is by veins of the same names that join other veins to form the portal vein.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	20 min	Explain functions of exocrine and endocrine pancreas.	<p><b>FUNCTIONS OF EXOCRINE PANCREAS:-</b></p> <ul style="list-style-type: none"> <li>As the exocrine pancreas secretes pancreatic juice which helps in the digestion of food in the intestine.</li> <li>Bicarbonate of pancreatic juice stops the function of pepsin of stomach and make the food alkaline.</li> <li>Digestion of protein :- trypsinogen and chymotrypsinogen are activated by enterokinase , an enzyme in the microvilli of small intestine. , which convert them into active form trypsin and chymotrypsin. The trypsin and chymotrypsin convert polypeptide into tripeptides, dipeptides and amino acids.</li> <li>Digestion of carbohydrates:- pancreatic amylase convert all digestible polysaccharides (starch)</li> <li>Digestion of fat:- lipase converts the fat into fatty acids and glycerols.</li> <li>The secretion of pancreatic juice is stimulated by the secretin and CCK (cholecystokinin) produced by the endocrine cells in the walls of duodenum. The presence of acid in chyme from stomach stimulates the production of these hormones.</li> </ul>	<p>T:- explaining the functions of pancreas (exocrine and endocrine pancreas) with ppt and black board, chart</p> <p>S:- listening and takes down notes and</p>	Describe the functions of pancreas including exocrine and endocrine pancreas?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b>FUNCTIONS OF ENDOCRINE PANCREAS:-</b></p> <p>Various types of cells of pancreatic islets secretes different hormones , functions as follow to maintain the blood glucose level.</p> <p>a. INSULIN:-</p> <ul style="list-style-type: none"> <li>• It is a polypeptide consists about 50 amino acids.</li> <li>• It lower the raised blood nutrients levels including glucose, amino acids and fatty acids.</li> <li>• These effects are anabolic which promotes storage of nutrients.</li> <li>• When glucose in excess, the insulin promotes their storage by :- <ul style="list-style-type: none"> <li>- Acting on cell membranes and Stimulating uptake and use of glucose by muscles and connective tissue.</li> <li>- Glycogenesis:- conversion of glucose to glycogen.</li> <li>- Accelerating uptake of amino acids by cells and synthesis of protein.</li> <li>- Lipogenesis :- promote synthesis of fatty acids and storage of fat in adipose tissue.</li> <li>- Decreasing Glycogenolysis:- Break down of glycogen into glucose</li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- Prevent gluconeogenesis: - prevent break down of protein and fat.</li> <li>• Secretion of insulin is stimulated by increased blood glucose levels for example after meal etc.</li> </ul> <p>b. GLUCAGON:-</p> <ul style="list-style-type: none"> <li>• Increase blood glucose level by stimulating :-</li> <li>- Glycogenolysis</li> <li>- Gluconeogenesis</li> <li>• Secretion of glucagon is stimulated by low blood glucose level and exercise and decreased by somatostatin and insulin</li> </ul> <p>c. SOMATOSTATIN:-</p> <p>It is also produced by hypothalamus, inhibits the secretion of both insulin and glucagon in addition to inhibiting the secretion of GH from the anterior pituitary.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5	2 min	Enumerate diseases and disorders related to pancreas	<b>DISEASES AND DISORDERS RELATED TO PANCREAS:-</b> <ul style="list-style-type: none"> <li>- Diabetes mellitus</li> <li>- Pancreatitis</li> <li>- Hyperinsulinism</li> </ul>	T:- listout the diseases and disorders related to pancreas. S:- student takes down notes	Listout the diseases and disorders of pancreas.

**Summary : & Evaluation (10 min)**

- In this lesson plan we have discussed about the pancreas. Which is a vital organ related to digestive system and also endocrine system. The pancreatic juice released from exocrine part and hormone insulin and glucagon released from endocrine part. The hormones maintains the blood glucose level by various activities.

**Assignment :**

- Write an assignment on structure and functions of pancreas.

**Evaluation :**

- Describe the macro and micro structure of pancreas
- Explain the endocrine and exocrine functions of pancreas.

**Bibliography :**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 226-228, 308-310
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# LESSON PLAN

Subject	: Bio – Science (anatomy and physiology)
Unit	: IX
Topic	: <b>Structure and functions of testes and ovaries</b>
Group	: GNM First year
Place	: Class – Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion
AV aids / instructional aids	: Chalk-Board, & Charts and ppt
Student Pre requisite	: The student should be able to gain knowledge of structure and functions of testes And ovaries.
General Objective	: At the end of the class the student will be able to gain knowledge of structure and Functions of testes and ovaries.
Specific Objectives	: At the end of the class student will be able to – <ul style="list-style-type: none"><li>➤ Discuss the position and size of testes.</li><li>➤ Explain structure of testes.</li><li>➤ Discuss the functions of testes</li><li>➤ Describe the position and size of ovary</li><li>➤ Explain structure of ovaries.</li><li>➤ discuss the function of ovaries.</li></ul>

**Review of previous class :** Ask question regarding testes & ovaries its importance.

**Introduction: 2min**

Ask students about testes & ovaries. Tell a story a person undergoing treatment of fertility. Brain storm why they think how importance testes & ovaries. At the of session students must discuss the structure & functions of testes & ovaries.

SS.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Discuss the position and size of testes.	<p><b>TESTES:-POSITION AND SIZE</b> – The testes are the male reproductive gonads/ glands and are the equivalent of the ovaries in the females they are about 4.5cm long, 2.5cm wide and 3cm thick and are suspended in the scrotum by spermatic cord, they are surrounded by the three layers of tissue. 10-15 gm. Testes Develops in posterior abdominal wall and begin descent into scrotum through inguinal canal during seventh month of fetal development.</p> <p>The scrotum is a pouch of pigmented skin, fibrous and connective tissue and smooth muscles.</p> <p>1. <b>Tunica vaginalis</b> – This is a double membrane, forming the outer covering of the testes and pelvic peritoneum. The testes develop in the lumbar region of the abdominal cavity just below the kidneys. They then descend in to the scrotum taking with them covering of peritoneum blood and lymph vessels, nerves and the deferent duct.</p> <p>The peritoneum eventually surrounds the testes in the scrotum and because detached from the abdominal peritoneum. Descent of the testes into the scrotum should be complete by the 8<sup>th</sup> month of foetal life.</p>	<p>T:- Explain position and size of testes with ppt and chart</p> <p>S:- listening and takes down notes</p>	Where the testes situated?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
2.	5 min	Explain structure of testes	<p>2. <b>Tunica albugenia</b> – This is fibrous covering beneath the tunica vaginalis. In growths from septa. dividing the glandular structure of the testes into lobules.</p> <p>3. <b>Tunica vasculosa</b> – This consists of a network of capillaries supported by delicate connecting tissue.</p> <p><b>STRUCTURE –</b></p> <ul style="list-style-type: none"> <li>➤ In each testes are 200-300 lobules, and within each lobule are 1-4 convoluted loop of germinal epithelial cells called seminiferous tubules, which produce sperm by spermatogenesis.</li> <li>➤ Sertoli cells (sustentacular cells) support and protect developing spermatogenic cells, nourish spermatocytes, spermatid and sperm. Sertoli cells mediate the effects of testosterone and fsh. Also control movement of spermatogenic cells and release sperm into lumen of seminiferous tubule. They produce fluid for sperm transport.</li> </ul>	<p>T: Describe the structure of testes with ppt and black board</p> <p>S:- listening attentively and takes down notes</p>	Explain the internal microstructure of testes?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Between the tubules are group of interstitial cells (of leydig) that secretes the hormone testosterone after puberty.</li> <li>➤</li> <li>➤ At the upper pole of testes the tubules combine to form single tubules.</li> <li>➤ This tubule, about 6m in its packed into a mass called the epididymis. It leaves the scrotum as the deferent duct (vas deferens) in the spermatic cord. blood and lymph vessels pass to the testes in the spermatic cord.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3	10 min	Discuss the functions of testes	<b>FUNCTIONS OF TESTES–</b> <ul style="list-style-type: none"> <li>➤ Spermatozoa (sperm) are produced in the seminiferous tubules of the testes, and mature as they pass through the long and convulated epididymis, where they are stored. FSH from the anterior pituitary stimulates sperm production.</li> <li>➤ A mature sperm has a head a body and a long whip like tail used nucleus containing its DNA.</li> <li>➤ It also contains the enzymes required to penetrate the outer layers of the ovum to reach and fuse with its nucleus. The body of the sperm is packed with mitochondria to fuel the propelling action of the tail that power of sperm along the female reproductive tract.</li> <li>➤ Successful spermatogenesis takes place at temp. About 3<sup>0</sup>c below normal body temperature.</li> <li>➤ The testes are cooled by their position outside the abdominal cavity and the thin outer covering of scrotum has very little insulating fat.</li> <li>➤ Sperm production in males begins at puberty and continues throughout life.</li> <li>➤ <b>Spermatogenesis :-</b></li> </ul>	T:- explain the functions of testes with ppt S:- listening and takes down notes	What are the functions of testes?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- Spermatogonia is the most primitive cells. Each spermatogonium gives rise to 64 spermatozoa.</li> <li>- between spermatogonium to the development of spermatozoa there are four stages:- a. Spermatogonia, b. Spermatocyte, c. Spermatid, d. Spermatozoa</li> <li>- spermatogonium contains 46 chromosomes. From spermatogonium develops primary spermatocytes, by mitosis. From primary , by meiosis, develops the secondary spermatocytes (containing 23 chromosomes). From secondary spermatocytes , successively , spermatids , spermatozoa, all containing (23) chromosomes are formed.</li> <li>- Time taken for the development of spermatozoa in seminiferous tubules is 74 days.</li> <li>- The spermatozoa within the seminiferous tubule are immature. Which enters in epididymis and stay for 2 month and become mature.</li> </ul> <p><b>Role of hormones in spermatogenesis:-</b></p> <ul style="list-style-type: none"> <li>- <b>GnRH</b> (gonadotropin releasing hormone) from hypothalamus stimulates anterior pituitary , causes producton of FSH and LH.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- <b>FSH:-</b> acts on sertoli cells , which stimulates production of spermatocytes from spermatogonia</li> <li>- <b>LH:-</b> act on leydig cells for production of testosterone</li> <li>- Enzyme 5 alfa reductase converts testosterone into more potent androgen called DIHYDROTESTOSTERONE.</li> <li>- DHT and testosterone are responsible for development of sexual characteristics at puberty.</li> <li>- Inhibin secretion from sertoli cells inhibits secretion of FSH.</li> </ul>		



S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
4.	5 min	Describe the position and size of ovary	<b>OVARIES:-</b> <b>POSITION AND SIZE –</b> <ul style="list-style-type: none"> <li>➤ The ovaries are the female's gonads and they lie in a shallow fossa on the lateral walls of the pelvis they are 2.5 – 3.5cm long, 2cm wide and 1cm thick.</li> <li>➤ Unshelled Almond shape gland</li> <li>➤ Lies in superior portion of pelvic cavity</li> <li>➤ Each is attached to the upper part of the uterus by the ovarian ligament and to the back of the broad ligament by a broad band of tissue the mesovarium. Blood vessels &amp; nerves pass to the ovary through the mesovarium.</li> </ul>	T: explain the position and size of ovary on ppt S:- listen attentively and makes diagram	Describe the structure of ovary?
5.	10 min	Explain structure of ovaries.	<b>STRUCTURE –</b> The ovaries have two layers of tissue . <ol style="list-style-type: none"> <li>1. Medulla – this lies in the centre and consists of fibrous tissue, blood vessels and nerves.</li> <li>2. Cortex – <ul style="list-style-type: none"> <li>- This surrounds the medulla. It has a framework of connecting tissue, or stroma, covered by germinal epithelium. It does not produce oocyte so Its a misnomer.</li> </ul> </li> </ol>	T: explain the structure of ovary on ppt S:- listen attentively and makes diagram	Discuss structure of ovaries?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- Tunica albugenia:- is a whitish capsule of dense, irregular connective tissue immediately deep to the germinal epithelium.</li> <li>- Stroma is a region of connective tissue deep to the tunica albugenia</li> <li>- Cortex contains ovarian follicle and various stages of maturity, each of which contains an ovum. Before puberty the ovaries are inactive but the stoma already contains immature (premordial) follicle, which the female has been from birth during the child bearing years. about every 28 days one or more ovarian follicle (graaffian follicle) matures, reatures and release its ovum in to the peritoneal cavity.</li> <li>- this is called ovulation and it occurs during most menstrual cycles following ovulation, the reputured follicle develops into the corpus inteum, which in turn will leave a small permanent scar of fibrous tissue called the corpus albicans on the surface of the body.</li> </ul> <p>Corpus luteum :- it contains the remants of an ovulated mature follicles. It produce progesterone, estrogen and relaxin and inhibin and further turns into corpus albicans.</p>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
6.	10 min	Explain functions of ovaries.	<p><b>FUNCTIONS –</b></p> <ul style="list-style-type: none"> <li>➤ The ovary is the organ in which the female gametes are stored and develop prior to ovulation their maturation is controlled by the hypothalamus and the anterior pituitary gland which releases gonadotropins (FSH &amp; LH) both of which act on the ovary. In addition the ovary has endocrine functions and releases hormones essential to the physiological changes during the reproductive cycle.</li> <li>➤ The source of these hormones, oestrogen, progesterone and in within, is the follicle itself. During the first half of the cycle, while the ovum is developing within the follicle, the follicle secretes increasing amounts of oestrogen. However after ovulation the corpus luteum secretes primarily progesterone with some oestrogen and inhibin.</li> </ul> <p><b>OÖGENESIS:-</b></p> <ul style="list-style-type: none"> <li>- The formation of haploid (n) secondary oocytes in the ovaries involves several phases, including meiosis and called oogenesis.</li> <li>- During early fetal development, primordial (primitive) germ cells migrate from the endoderm of</li> </ul>	<p>T: explain the structure of ovary on ppt</p> <p>S:- listen attentively and makes diagram</p>	What are the functions of ovarian?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>yolk sac to the ovaries. There , germ cells differentiate within the ovaries into oogonia. Oogonia are diploid(2n) cells that divide mitotically to produce millions of germ cells. Even before birth many of these germ cells degenerated. A few develop into larger cells called primary oocytes.</p> <ul style="list-style-type: none"> <li>- At birth 20000- 200000 oogonia and primary oocytes remains in the each ovary. Of these, about 400 will mature and ovulate during a women's reproductive age. The remainder undergo atresia.</li> <li>- Primary oocyte also called primordial follicle</li> <li>- Primary follicle converted into secondary follicle</li> <li>- After puberty , under the influence of Gonadotropin hormones secreted by anterior pituitary gland, each month meiosis resumes in one secondary follicle.</li> <li>- The diploid primary oocyte completes reduction division(meiosis-1) and two haploid cells of unequal size, both with 23 chromosome (n) of two chromatid each, are produced. Smaller cell produced by meiosis -1 , called first polar body. The larger cell known as secondary oocyte.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- Secondary oocyte proceeds to metaphase of equatorial division (meiosis-2) and then stop at this stage. The follicle in which this event takes place called mature or graffian follicle will soon rupture and release its secondary oocyte.</li> <li>- At ovulation , usually secondary oocyte is expelled into the pelvic cavity which swept into uterine tube.</li> <li>- If fertilization not occur the secondary oocyte degenerates.</li> <li>- If fertilization occur, equatorial division (meiosis-2) resumes. The secondary oocyte splits into two haploid(n) cells of unequal size.</li> <li>- The larger cell is the ovum or mature egg, smaller one is the second polar body.</li> <li>- The nuclei of the sperm cell and the ovum then unite, forming a diploid (2n) zygote.</li> <li>- First polar body goes another division to produce two polar bodies, which all degenerates.</li> <li>- Thus one oogonium gives rise to a single gamete (ovum).</li> </ul>		

**SUMMARY : & EVALUATION (10 MIN)**

- In this chapter we have discussed about the structure and functions of testes. The testes are male gonads, responsible for sexual characteristics in male and also production of male gametes sperm. The ovary is female gonads responsible for sexual character in female and also responsible for production of female hormones and formation of female gamete / ovum formation.

**ASSIGNMENT :**

- Describe the structure and functions of testes & ovarian.

**EVALUATION :**

- Unit test for 50 marks once the unit is completed.

**BIBLIOGRAPHY :**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n453-454, 459-60
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# LESSON PLAN

Subject	: Bio-Science
Unit	: 10
Topic	: <b>281 -Structure Of Female Reproductive System</b>
Group	: GNM I year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Demonstration
AV aids / instructional aids	: Black Board And Chalk Chart
Student Pre requisite	: The student should be able to identify functions of female reproduction system.
General Objective	: At the end of the class the student will be able to gain knowledge regarding functions of female Reproductive system.
Specific Objectives	: At the end of the class the students will be able to <ol style="list-style-type: none"><li>Enlist the functions female reproductive system.</li><li>Enlist Female reproductive organs</li><li>Describe the structure of Female Reproductive system.</li></ol>
Review of previous class	: Ask Questions about Reproductive organs information regarding Female reproductive system and Structure.

**Introduction:** Ask the Students if you know about reproductive organs, Now we going to discuss. Female reproductive system and its structure, and The Important and also mention the objectives of the lesson to the students here.

S.No	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1.	5 min	Introduction of Female Reproductive System	<ul style="list-style-type: none"> <li>➤ The Reproductive organs in the female are those concerned with copulation, fertilization, growth and development of the fetus its subsequent exit into the outer world and nature following birth.</li> <li>➤ Female Reproductive organs constitute               <ol style="list-style-type: none"> <li>1) External Genitalia(vulva)</li> <li>2) Internal Genital organs</li> <li>3) Accessory reproductive organs</li> </ol> </li> </ul>	T:- Explain student S: listen & take notes.	Ask question
2.	5 min	Enlist Female reproductive organs	External genitalia (vulva) <ul style="list-style-type: none"> <li>➤ The external female genital organs (vulva) consists of the following structures-               <ol style="list-style-type: none"> <li>1) <b>The Mons pubis or Mons vineries</b> <ul style="list-style-type: none"> <li>• It is a pad of subcutaneous adipose connective tissue lying over the symphysis pubis. It is covered with public hair from puberty.</li> </ul> </li> <li>2) <b>The labia majora (greater lips)</b> <ul style="list-style-type: none"> <li>• These are two large folds of fat and areolar, fibrous tissue, covered with skin and public hair on the outer surface. It forms boundary of vulva. The inner surface of the labia majora are hairless. Labia majora are covered with squamous epithelium and contain sebaceous glands, apocrine sudoriferous (sweat) glands &amp; hair follicles.</li> <li>• Labia majora are homologous to scrotum.</li> </ul> </li> </ol> </li> </ul>	T:- enlist student with ppt S: listen & take notes.	
3.	10 min	Describe structure of female reproductive system		T:- discuss student S: listen & take notes.	List External genital organ.



S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<p><b>3) The Labia Minora (Lesser Lips)</b></p> <ul style="list-style-type: none"> <li>- These two thin smaller folds of skin lying between the labia majora. Anteriorly they divide to enclose the clitoris. Posteriorly they fuse forming fourchette. It contains connective tissue, numerous sebaceous glands /eccrine sweat glands, erectile muscle fibres and numerous vessels and nerves endings.</li> </ul> <p><b>4) Clitoris</b></p> <ul style="list-style-type: none"> <li>- It is a small cylindrical erectile body measuring about 2.5c.m, situated in the most anterior part of the vulva. It is a rudimentary organ corresponding to the male penis it is extremely sensitive and highly vascular and plays a part in sexual intercourse. It contains sensory nerve endings and erectile tissue.</li> </ul> <p><b>5) The Vestibule</b></p> <ul style="list-style-type: none"> <li>- It is a triangular space bounded anteriorly by the clitoris, posteriorly by the fourchette and on either side by labia minora. It is a cleft between the labia minora. There are four opening into the vestibule. <ul style="list-style-type: none"> <li>a. The urethral opening :- upper small opening , anterior to the vaginal orifice and posterior to the clitoris. It is the opening of urethra to the exterior.</li> </ul> </li> </ul>		

			<p>b. Vaginal orifice or introitus:- the larger opening of vagina to the exterior, occupies the greater portion of vestibule. And it is bordered by the hymen. The bulb of vestibules consists of two elongated masses of erectile tissue just deep to the labia on either side of the vaginal orifice. The bulb become engorged with blood during sexual arousal, narrowing the vaginal orifice and placing pressure on the penis during intercourse.</p> <p><b>6) Vestibular or Bartholin's gland:-</b></p> <ul style="list-style-type: none"> <li>- These are situated one on each side near the vaginal opening. They are about the size of small pea and their ducts open into the vestibule immediately lateral to the attachment of the hymen. They secrete mucus that keeps the vulva moist.</li> </ul>		
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S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
4.	10 min	Describe structure of internal	<p><b>Blood Supply</b></p> <ul style="list-style-type: none"> <li>- Internal pudendal arteries, branch of internal iliac arteries and external pudendal arteries branch of femoral arteries.</li> <li>- Venous drainage :- large plexus drains into internal iliac veins.</li> </ul> <p><b>Lymphatic Drainage</b></p> <ol style="list-style-type: none"> <li>1.) Inguinal lymph nodes</li> <li>2.) Internal iliac lymph nodes</li> </ol> <p><b>Nerve Supply</b></p> <p>Pudendal nerve</p> <ol style="list-style-type: none"> <li>1.) Anterior-genito- femoral nerve (L1 &amp; L2)</li> <li>2.) Posterior Inferior- Pudendal branches (S1,2 &amp; S3)</li> </ol> <p><b>INTERNAL GENITALIA</b></p> <p>It consists vagina, uterus, two uterine tubes and two ovaries.</p> <p><b>VAGINA:-</b></p> <ul style="list-style-type: none"> <li>- Vagina is a fibro musculo-membraneous tube communicating the uterine cavity with the exterior at the vulva. It is lined with stratified squamous epithelium, opening in to the vestibule at its distal end and with the uterine cervix protruding into its proximal ends.</li> </ul>	<p>T:- Explain student</p> <p>S: listen &amp;</p>	<p>Q. Describe structure of internal</p>

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
		genital organs	<ul style="list-style-type: none"> <li>- It runs obliquely upwards and backwards at the angle of about 45 degree between the bladder in front and rectum and anus behind.</li> <li>- Vagina has an anterior, a posterior and two lateral walls, posterior walls to 9-10c.m. and anterior wall us 7-7.5c.m. The difference is due to the angle of the insertion of the cervix through the anterior wall. The upper part of the vagina is known as vault. Vault forms a circular recess known as fornix/ fornices (posterior Formicas) have small folds known as rugae.</li> <li>- <b>HYMEN:-</b> the hymen is a thin layer of mucus membrane that partially occludes the opening of the vagina. It is normally incomplete allows the passage of menstrual flow and is stretched or completely torn away by sexual intercourse, insertion of a tampon or child birth.</li> </ul> <p><b>INTERNAL STRUCTURE:-</b></p> <ul style="list-style-type: none"> <li>- Vaginal wall has three layers :- <ul style="list-style-type: none"> <li>a. Outer layer :- areolar tissue</li> <li>b. Middle layer:- smooth muscles</li> <li>c. Inner layer:- stratified squamous epithelium that form ridges or rugae.</li> </ul> </li> <li>- It has no secretory glands but the surface is kept moist by cervical secretions.</li> </ul>	take notes.	genital organs?

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<ul style="list-style-type: none"> <li>- Between the puberty and the menopause , lactobacillus acidophilus , bacteria that secretes lactic acid are normally present maintain the pH between 4.9 to 3.5. the acidity inhibits the growth of most other micro-organism that may enter the vagina from the perineum or during sexual intercourse.</li> </ul> <p><b>Blood Supply</b></p> <ul style="list-style-type: none"> <li>- Branches of the internal iliac artery and includes the vaginal artery &amp; descending branch of the uterine artery.</li> <li>- The blood drains through the corresponding veins in to internal iliac vein.</li> </ul> <p><b>Lymphatic Drainage</b></p> <ul style="list-style-type: none"> <li>- Inguinal the internal iliac and Sacral Gland.</li> </ul> <p><b>Nerve Supply</b></p> <p>Sympathetic and Parasympathetic nerve from pelvic plexus.</p>		

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<p><b>THE UTERUS:</b> (womb)</p> <ul style="list-style-type: none"> <li>- Pathway for sperm to reach uterine tube.</li> <li>- The site of menstrual changes, implantation of fertilized ovum, development of fetus during pregnancy and labour.</li> <li>- Uterus is a hollow, muscular pear shaped organ, flattened anterioposteriorly. It lies in the pelvic cavity between the urinary bladder and the rectum.</li> <li>- In most women, it lean forward (anteversion) and is bent forward (anteflexion) almost at right angles to the vagina, so that its anterior wall rests partly against the bladder below, forming the vesicouterine pouch between the two organs.</li> <li>- When the body is upright, the uterus lies in an almost horizontal position.</li> <li>- It is 7.5c.m. Long, 5c.m. wide and its wall about 2.5c.m. thick.</li> <li>- It weights between 30 to 40 gms.</li> <li>- The uterus has the following parts <ul style="list-style-type: none"> <li><b>1.) Fundus</b></li> <li><b>2.) Body or corpus</b></li> <li><b>3.) Isthmus</b></li> <li><b>4.) Cervix</b></li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<p><b>1) Fundus:-</b> the dome shaped part of the uterus above the opening of the uterine tube.</p> <p><b>2) Body:-</b> the major part. Narrowest inferiorly at the internal OS where it continuous with the cervix.</p> <p><b>3) Cervix (neck of the uterus):-</b> this protrudes through the anterior wall of the vagina, opening into it at the external os. Secretory cells of mucosa of cervix produce cervical mucus (20-60 ml per day). It is more receptive to sperm at or near time of ovulation. Also play role in capacitation of sperm.</p>		

S.No	Time	Specific Objective	CONTENT	Teaching Learning activity	Evaluation
			<p><b>STRUCTURE / LAYERS OF UTERUS:-</b></p> <p>Three layers :- perimetrium, myometrium, endometrium.</p> <p>a. <b>PERIMETRIUM:-</b></p> <ul style="list-style-type: none"> <li>- This is a peritoneum / serous layer.</li> <li>- Anteriorly it lies over the fundus and the body where it is folded on to the upper surface of the urinary bladder. This fold forms the <b>vesicouterine</b> pouch.</li> <li>- Posteriorly:- peritoneum covers the fundus, body and cervix. Then it folds back on to the rectum to form the <b>rectouterine</b> pouch (of douglas)</li> <li>- Laterally only fundus is covered because the peritoneum forms a double fold with the uterine tube in the free border. This double fold is the <b>broad ligament</b>, attaches the uterus to the sides of the pelvis.</li> </ul> <p>b. <b>MYOMETRIUM:-</b> thickest layer. It is a mass of smooth muscles fibres interlaced with areolar tissue, blood vessels and nerves.</p> <p>c. <b>ENDOMETRIUM:-</b></p> <ul style="list-style-type: none"> <li>- It consists of columnar epithelium covering a layer of connective tissue containing a large number of mucus secreting tubular glands.</li> </ul>		



S.No	Time	Specific Objective	CONTENT	Teaching Learning activity	Evaluation
			<p>Highly vascular with spiral arteries branches of uterine arteries.</p> <ul style="list-style-type: none"> <li>- It is divided into two layer;-               <ul style="list-style-type: none"> <li>i. Functional layer:- upper layer and thickens and become rich in blood vessels in first half of menstrual cycle. If the ovum not fertilised and does not implant, this layer shed during menstruation.</li> <li>ii. Basal layer:- next to myometrium and not lost during menstruation. It regenerates the functional layer during each menstrual cycle.</li> </ul> </li> <li>- The upper two third of the cervical canal is lined with this mucous membrane, which is continuous with the lining of the vagina itself.</li> </ul> <p><b>Blood Supply</b></p> <ul style="list-style-type: none"> <li>- Uterine Arteries, branches of Uterine internal iliac arteries.</li> <li>- Venous drainage Same route as arteries, edrains into internal iliac vein.</li> </ul> <p><b>Nerve Supply</b></p> <p>Parasympathetic fibres from sacral outflow and sympathetic fibres from from the lumbar outflow. Pelvic Plexus.</p> <p><b>Lymphatic Drainage</b></p> <p>Deep and superficial lymph vessels drain lymph from the uterus and uterine tubes to the aortic lymph nodes and group of nodes associated</p>		

S.No	Time	Specific Objective	CONTENT	Teaching Learning activity	Evaluation
			<p>with the iliac blood vessels.</p> <p><b>SUPPORTING STRUCTURES:-</b></p> <ul style="list-style-type: none"> <li>- Uterus supported by surrounding organs, muscles of the pelvic floor and ligaments. <ul style="list-style-type: none"> <li>a. <b>Broad ligaments:-</b></li> <li>- Double fold of peritoneum, one on each side of the uterus. <ul style="list-style-type: none"> <li>b. <b>Round ligaments:-</b> these are bands of fibrous tissue between the two layers of broad ligaments, one on each side of uterus.</li> <li>c. <b>Uterosacral ligaments:-</b> originates from the posterior walls of the cervix and vagina and extends backwards, one on each side of the rectum, to the sacrum.</li> <li>d. <b>Transverse cervical (Cardinal) ligaments:-</b> these extends one from each side of the cervix and vagina to the side wall of the pelvis.</li> <li>e. <b>Pubocervical fascia;-</b> this extends forwards from the transverse cervical ligaments on each side of the bladder and is attached to the posterior surface of the pubic bones.</li> </ul> </li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5.	5 min	Describe the Structure of uterine tubes	<p><b>UTERINE TUBES [FALLOPIAN TUBES / oviducts]</b></p> <ul style="list-style-type: none"> <li>- Uterine tubes are paired structure, measuring about 10 c.m long and extends from the sides of the uterus between the body and the fundus. They lies in the upper free border of the broad ligaments. Their trumpet shaped lateral ends penetrates the posterior wall, opening into the peritoneal cavity close to the ovaries. The end of each tube has finger like projection called fimbriae. Longest called ovarian fimbriae. Each tube has got two opening, uterine opening and pelvic opening.</li> <li>- They transport secondary oocyte and fertilised ova <ul style="list-style-type: none"> <li>• Infundibulum :- open funnel shaped part , close to ovary 1.25 cm</li> <li>• Fimbriae:- Finger like projection 1.25</li> <li>• Ampulla:- wide and longest part :- fertilization occur in this part only 5 cm</li> <li>• Isthmus:- medial, short, narrow, thick walled that joins</li> </ul> </li> </ul>	T: Explain with the help of PPT.	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>uterus. 2.5cm</p> <p><b>Structures / Layers of fallopian tube:-</b></p> <ul style="list-style-type: none"> <li>➤ Consists of three layers <ul style="list-style-type: none"> <li>a.) Outer Peritoneum /Serous:- broad ligament</li> <li>b.) Middle / Muscular:- smooth muscles</li> <li>c.) Mucosal membrane:- ciliated epithelium :- helps in movement of oocyte etc. And provide nourishment.</li> </ul> </li> <li>- Blood supply and nerve supply and lymphatic drainage are as for the uterus.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
4.	5 min	Describe the position and size of ovary	<b>OVARIES:-</b> <b>POSITION AND SIZE –</b> <ul style="list-style-type: none"> <li>➤ The ovaries are the female's gonads and they lie in a shallow fossa on the lateral walls of the pelvis they are 2.5 – 3.5cm long, 2cm wide and 1cm thick.</li> <li>➤ Unshelled Almond shape gland</li> <li>➤ Lies in superior portion of pelvic cavity</li> <li>➤ Each is attached to the upper part of the uterus by the ovarian ligament and to the back of the broad ligament by a broad band of tissue the mesovarium. Blood vessels &amp; nerves pass to the ovary through the mesovarium.</li> </ul>	T: explain the position and size of ovary on ppt S:- listen attentively and makes diagram	Describe the structure of ovary?
5.	10 min	Explain structure of ovaries.	<b>STRUCTURE –</b> The ovaries have two layers of tissue . <ol style="list-style-type: none"> <li>1. Medulla – this lies in the centre and consists of fibrous tissue, blood vessels and nerves.</li> <li>2. Cortex – <ul style="list-style-type: none"> <li>- This surrounds the medulla. It has a framework of connecting tissue, or stroma, covered by germinal epithelium. It does not produce oocyte so Its a misnomer.</li> <li>- Tunica albugenia:- is a whitish capsule of dense, irregular connective tissue immediately deep to the</li> </ul> </li> </ol>	T: explain the structure of ovary on ppt S:- listen attentively and makes diagram	Discuss structure of ovaries?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>germinal epithelium.</p> <ul style="list-style-type: none"> <li>- Stroma is a region of connective tissue deep to the tunica albugenia</li> <li>- Cortex contains ovarian follicle and various stages of maturity, each of which contains an ovum. Before puberty the ovaries are inactive but the stoma already contains immature (premordial) follicle, which the female has been from birth during the child bearing years. about every 28 days one or more ovarian follicle (graaffian follicle) matures, reatures and release its ovum in to the peritoneal cavity.</li> <li>- this is called ovulation and it occurs during most menstrual cycles following ovulation, the reputured follicle develops into the corpus inteum, which in turn will leave a small permanent scar of fibrous tissue called the corpus albicans on the surface of the body.</li> <li>- Corpus luteum :- it contains the remants of an ovulated mature follicles. It produce progesterone, estrogen and relaxin and inhibin and further turns into corpus albicans.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	15 min	Accessory organ of breast.	<p><b>ACCESSORY ORGANS OF FEMALE REPRODUCTIVE SYSTEM</b></p> <p><b>BREAST</b></p> <ul style="list-style-type: none"> <li>➤ The two mammary glands are modified sudoriferous (sweat glands) that produce milk.</li> <li>➤ These are accessory glands of the female reproductive system.</li> <li>➤ They exist also in male but in only a rudimentary form.</li> </ul> <p><b>POSITION AND STRUCTURE OF BREAST:-</b></p> <ul style="list-style-type: none"> <li>➤ Present bilaterally in the pectoral region in both sexes.</li> <li>➤ After puberty the female breasts are will developed.</li> <li>➤ The adult female breast has a base, nipple, areola and an auxiliary tail.</li> </ul> <p>a.) Base</p> <ul style="list-style-type: none"> <li>➤ The base is circular, vertically; it extends from the 2<sup>nd</sup> to 6<sup>th</sup> ribs, in the midclavicular line.</li> <li>➤ Horizontally it extends from the lateral border of sternum to the mid-axillary line.</li> <li>➤ The base rests mainly on the pectorals major muscle and the pectoral fascia.</li> <li>➤ A retro mammary tissue intervenes between the base</li> </ul>	<p>T. Explain by writing on the black board.</p> <p>S. Listen and take notes.</p>	<p>Q. Define the structure of breast.</p>

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>and the fascia covering the pectorals major muscles.</p> <p>b.) Nipple</p> <ul style="list-style-type: none"> <li>➤ The nipple is a conical projection below the centre of the breast.</li> <li>➤ It is pierced by 15-20 lactiferous ducts.</li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
2.	20 min	Structure of Breast	<ul style="list-style-type: none"> <li>➤ It has circularly and longitudinally arranged smooth muscles fibres.</li> <li>➤ The circular fibres erect the nipple for sucking and the longitudinal muscle retracts the nipple.</li> <li>➤ The nipple is richly innervated.</li> </ul> <p>Areola: The areola is the pigmented circular area of skin around the base of the nipple. Outer margin of the areola has modified sebaceous glands. They are enlarged during pregnancy and lactation and are known as “Montgomery’s tubercles”, their only secretions form a protective lubricant during lactation.</p> <p>Axillary tail or Spence</p> <ul style="list-style-type: none"> <li>➤ It is a tail like projection from the upper outer quadrant of the breast into the axilla.</li> </ul> <p><b>STRUCTURE</b></p> <ul style="list-style-type: none"> <li>➤ The breast is made up of 3 components-               <ol style="list-style-type: none"> <li>1) Glandular tissue</li> <li>2) Fibrous tissue</li> <li>3) fatty tissue</li> </ol> </li> </ul>	<p>T.: PPT</p> <p>S: Observe and Take Notes.</p>	<p>Q. Explain the components of Breast?</p>

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<p><b>a.) Glandular tissue</b></p> <ul style="list-style-type: none"> <li>➤ The glandular tissue consists of 15-20 pyramidal lobes, separated by adipose tissues.</li> <li>➤ Each lobe contains a number of glandular structure called lobules, where milk is produced. The lobules are composed of grape like clusters of milk secreting glands termed alveoli embedded in connective tissue.</li> <li>➤ Lobules open into tiny lactiferous ducts which drain milk towards the nipple.</li> <li>➤ Myoepithelial cells surround the alveoli, whose contraction helps propel milk towards the nipples.</li> <li>➤ When milk is being produced, it passes from alveoli into a series of secondary tubules. From here the milk enters the mammary ducts. Close to the nipple the mammary ducts expand to form sinuses called lactiferous sinuses, where some milk may be stored before draining into a lactiferous duct. This duct carries milk to exterior.</li> </ul> <p><b>b.) Fibrous tissue /connective tissue</b></p> <ul style="list-style-type: none"> <li>➤ It supports the lobes, connects the skin to the pectoral fascia. The suspensory ligaments of the breast run between the skin and</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
3	5 min	Discuss Blood supply and lymph drainage and nerve supply of breast	<p>➤ fascia and support breast. These ligaments become looser with age or undue stress.</p> <p><b>c.) Fatty tissue</b></p> <p>➤ The interloper fatty tissue makes the breast rounded in contour.</p> <p>➤ The amount of adipose tissue determined the size of breast, not the amount of milk produced.</p> <p><b>BLOOD SUPPLY, LYMPH DRAINAGE AND NERVE SUPPLY:-</b></p> <ul style="list-style-type: none"> <li>- Arterial supply:- thoracic branches of the axillary arteries and from the internal mammary and ntercostal arteries.</li> <li>- Venous drainage:- axillary and mammary veins</li> <li>- Lymph drainage:- superficial axillary lymph vessels and nodes. Internal mammary nodes.</li> <li>- Nerve supply:- 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> thoracic nerves . Somatic sensory nerves endings in breast and around nipple.</li> </ul>	<p>T:- enumerate blood supply and nerve supply with power point</p> <p>S: takes down notes and listening attentively</p>	Tell the arterial blood supply, venous drainage and nerve supply of breast?

**Summary : & Evaluation (10 min)**

- In this lesson plan we have discussed various structures of female reproductive system. The female reproductive system divided into external genitalia. The external genitalia consists labia majora, labia minora, vestibule, urethral and vaginal opening etc. The internal genitalia consists ovary, uterus and uterine tube. The breast is an accessory organ of female reproductive system.

**Assignment :**

- Describe the structure of female reproductive organs.

**Evaluation :**

- Take the unit test, after the completion of the unit.

**Bibliography :**

- ANNAMMA JACOB - A comprehensive text book of midwifery II Edition 2008.
- DC DUTTA Text books of obstetrics –7<sup>th</sup> Edition including perinatology and contraception.
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## LESSON PLAN

Subject	: Bio-Science
Unit	: 10 The Reproductive System
Topic	: <b>282 Functions Of Female Reproduces System</b>
Group	: GNM I year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Demonstration
AV aids / instructional aids	: Black Board And Chalk Chart, Power Point
Student Pre requisite	: The student should be able to identify functions of female reproduction system.
General Objective	: At the end of the class the student will be able to gain knowledge regarding the functions of female Reproductive system.
Specific Objectives	: At the end of the class the students will be able to a.) Enlist the functions female reproductive system. b.) Enlist Function of External Genitalia. c.) Enlist the Function of Internal Genital Organ. d.) Enlist of Function of Accessory reproductive organs.
Review of previous class	: Ask Questions regarding Functions of Female reproductive organs, what are the importance of different organs in reproductive system.

**Introduction:** Ask the Students, Now you know about reproductive system, do you know about the functions of female reproductive system, also mention the objectives of the lesson to the students here.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Enlist the functions of female reproductive system.	<b>FUNCTIONS OF FEMALE REPRODUCTIVE SYSTEM:-</b> <ul style="list-style-type: none"> <li>➤ Formation of ova</li> <li>➤ Reception of spermatozoa</li> <li>➤ Provision of suitable environment for fertilization and fetal development</li> <li>➤ Parturition (child birth)- provide pathway</li> <li>➤ Lactation, production of breast milk</li> </ul>	Explained function with use of use of Black board & Chalk, chart S: listen and take notes.	Ask question regarding Female reproductive system.
2.	5 min	Enlist the functions of external genitalia	<b>FUNCTIONS OF EXTERNAL GENITALIA</b> <ul style="list-style-type: none"> <li>➤ Plays a part in sexual intercourse.</li> <li>➤ During sexual excitement. Bartholin's gland produce abundant alkaline mucus. Which helps in lubrication and moisture.</li> </ul>	Enumerate the external genitalia functions with power point presentation S: listen and take notes.	Ask question of external genitalia and its parts.
3.	10 min	Enlist the functions of internal genital organ	<b>VAGINA</b> The Vagina <ul style="list-style-type: none"> <li>➤ Acts as receptacle for the penis during sexual</li> </ul>	T: Explain functions of vagina with	Listout the functions of vagina?





S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5.	10 min	Enlist the function of uterine tubes	<b>THE UTERINE TUBES</b> <ul style="list-style-type: none"> <li>➤ Uterine tube propels the ovum towards the uterus by peristalsis and ciliary movement.</li> <li>➤ Secretion of uterine tube nourish both ovum and spermatozoa.</li> <li>➤ Receives the Spermatozoa.</li> <li>➤ Provide a site for fertilization.</li> </ul>	T:Discuss functions of uterine tube with power point S: listen and take notes.	Ask question related to function of uterine tubes.
6.	5 min	Describe the functions of ovaries.	<b>OVARIES</b> <ul style="list-style-type: none"> <li>➤ Ovaries are the organ in which the female gametes are stored and develop prior to ovulation.</li> <li>➤ Produce ova.</li> <li>➤ Produce estrogen and progesterone during reproductive age.</li> </ul>	T:Explain functions of ovaries with power point S: listen and take notes.	Ask question about function of ovaries.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
7.	5 min	Enlist the function of Accessory reproductive organs.	<b>Breast</b> <ul style="list-style-type: none"> <li>➤ sexual characteristics serve as Mammary gland which produce milk lactation following child birth.</li> </ul>	Students listen & take notes.	Ask question about function of breast.

**Summary : & Evaluation (10 min)**

- In this chapter we have discussed about the functions of female reproductive system. Each and every part of female reproductive system has their unique function.
- What are the functions of Female Reproductive system and Enlist Function of reproductive organs.

**Assignment :**

- Describe the functions of Female reproductive system .

**Evaluation :** What are the functions of Female Reproductive system and Enlist Function of reproductive organs?

**Bibliography :**

- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 450-452
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- DC DUTTA Text books of obstetrics –7<sup>th</sup> Edition including perinatology and contraception.

## LESSON PLAN

Subject	: Bio-Science
Unit	: 10 The Reproductive System
Topic	: <b>283 – Process of Menstrual cycle.</b>
Group	: GNM I year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Demonstration
AV aids / instructional aids	: Power point. Black Board and Chalk Chart
Student Pre requisite	: Students know about menstruation but they have no idea about.
General Objective	: At the end of the class the student will be able to gain knowledge regarding Process Of Menstrual Cycle effectively.
Specific Objectives	: Define Menstruation a.) What are the basic needs of Menstrual Function. b.) Describe Endocrine Mechanism of Menstrual Cycle. c.) Describe different phases of Menstrual cycle. d.) Describe clinical features of Menstruation and management.
Review of previous class	: Ask Questions regarding Menstrual cycle Endocrine Mechanism and different phase.

**Introduction: 5 min** ,Today we are going to study menstrual cycle. What are the basic needs of menstrual cycle different phase of menstrual Cycle? Clinical features and management of menstrual cycle.

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Definition of Menstruation and Menstrual cycle.	<b>DEFINITION OR MEANING OF MENSTRUAL (REPRODUCTIVE) CYCLE:-</b> <ul style="list-style-type: none"> <li>➤ Menstruation (Greek word, men-month) is monthly uterine bleeding out flowing through vagina into vulva for 4-5 days every 28 days (24-35 days) during reproductive life a woman from menarche to menopause.</li> <li>➤ The Menstrual cycle of 28 days starts on day of onset of menstruation and ends at day 28 on start of next mens.</li> <li>➤ This a series of events, occurring regularly in females every 26 to 30 days throughout the child bearing period between the menarche and menopause.</li> <li>➤ The cycle consists of a series of changes taking place concurrently in the ovaries and uterine lining, stimulated by changes in blood concentration of hormones. Hormones secreted during this cycle are regulated by negative feedback mechanism.</li> </ul>	<p>T: Explain with the use of black board , chalk, ppt</p> <p>S: listen and take notes.</p>	Ask question Meaning of menstruation?
2.	5 min	What are the Basic needs of	<b>BASIC NEED OF MENSTRUAL FUNCTION:</b> <ul style="list-style-type: none"> <li>➤ Normal Female Chromosome.</li> </ul>	T: Explain with the use of black	Ask question What are the

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3.	35 min	Menstrual function?	➤ Cyclical Function of hypothalamus-pituitary-Ovarian axis under influence of normal cerebral cortex function.	board , chalk, ppt S: listen and take notes.	Basic needs of Menstrual function?
		Describe the phases of menstrual cycle.	<p><b>MENSTRUAL CYCLE AND ITS PHASES:-</b></p> <p>The average length of the cycle is about 28 days. By convention the days of the cycle are numbered from the beginning of the menstrual phase, which usually lasts about 4 days. This followed by the proliferative phase (10 days) and then by secretory phase (14 days).</p> <p>1. <b>Menstrual phase:-</b> menstruation or menses</p> <ul style="list-style-type: none"> <li>• When the ovum is not fertilised, the corpus luteum starts to degenerates. (in the event of pregnancy, the corpus luteum is supported by the human chorionic gonadotropin HCG secreted by developing embryo).</li> <li>• Progesterone and estrogen level therefore fall and the functional layers of endometrium, which is dependent on high levels of these ovarian hormones, is shed in menstruation.</li> <li>• The menstrual flow consists of the secretion from endometrial</li> </ul>	<p>T: Explain phases with the use of black board , chalk, ppt</p> <p>S: listen and take notes.</p>	Explain the menstrual phases in detail?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>glands, endometrial cells, 50-150 ml blood from the degenerating capillaries and the unfertilized ovum, mucus etc.</p> <ul style="list-style-type: none"> <li>During this phase, levels of oestrogen and progesterone are very low because the corpus luteum that had been active during second half of the previous cycle has degenerated. This means the hypothalamus and anterior pituitary can resume their cyclical activity and FSH level begins to rise, initiating a new cycle.</li> </ul> <p><b>2. PROLIFERATIVE PHASE</b></p> <ul style="list-style-type: none"> <li>At this stage an ovarian follicle, stimulated by FSH, is growing towards maturity and is producing oestrogen, which stimulates proliferation of the functional layer of the endometrium in preparation for the reception of the fertilised ovum.</li> <li>The endometrium thickens, becoming very vascular and rich in mucus secreting glands.</li> <li>Rising levels of oestrogen are responsible for triggering a surge of LH approximately mid cycle. This LH surge triggers ovulation (day 14), marking the end of the proliferative phase.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p><b>3. SECRETORY PHASE:-</b></p> <ul style="list-style-type: none"> <li>• After ovulation, LH from the anterior pituitary stimulates development of the corpus luteum from the ruptured follicle, which produces progesterone, some oestrogen and inhibin and relaxin.</li> <li>- Inhibin inhibits secretion of FSH and LH also.</li> <li>• Under the influence of progesterone, the endometrium becomes oedematous and the secretory glands produce increased amounts of watery mucus. This assist the passage of the spermatozoa through the uterus to the uterine tubes where the ovum is usually fertilised. There is similar increase in secretion of watery mucus by the glands of the uterine tubes and by the cervical glands that lubricates the vagina.</li> <li>• The ovum may survive in a fertilisable form for a very short time after ovulation, probably as little as 8 hours. The spermatozoa, deposited in the vagina during intercourse, may be capable of fertilising the ovum for only about 24 hours although the can survive for several days. Observable changes in the woman's body occur around the time of ovulation. Cervical mucus, normally thick and dry, becomes thin, elastic and watery and body temperature rises by about 1 degree</li> </ul>		



S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>Celsius immediately following ovulation. Some women experience abdominal discomfort in the middle of the cycle, though to correspond to rupture of the follicle and release of its content into the abdominal cavity.</p> <ul style="list-style-type: none"> <li>After ovulation, the combination of progesterone, oestrogen and inhibin from corpus luteum suppresses the hypothalamus and anterior pituitary, so FSH and LH levels fall. Low FSH levels in the second half of the cycle prevent further follicular development in case a pregnancy results from the current cycle. If the ovum is not fertilised, falling LH levels leads to degeneration and death of the corpus luteum, which is dependent on LH for survival. The resultant steady decline in circulating oestrogen, progesterone and inhibin leads to degeneration of the uterine lining and menstruation, with the initiation of a new cycle.</li> <li>If the ovum is fertilised there is no breakdown of the endometrium and no menstruation. The fertilised ovum / zygote travels through the uterine tube to the uterus where it becomes embedded in the wall and produces human chorionic gonadotropin (hCG), which is similar to anterior pituitary luteinising hormone. This hormone keeps the corpus luteum</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>intact, enabling it to continue secreting progesterone and oestrogen for the first 3-4 months of the pregnancy, inhibiting the maturation of the further ovarian follicles. During that time the placenta develops and produces oestrogen , progesterone and gonadotrophins.</p>		

**SUMMARY & EVALUATION (5 MIN)**

- Today we discussed about, Menstruation, Menstrual Cycle. What are the basic need for menstruation? Endocrine action, Different phase of menstruation cycle in detail. Being a nurse we must know the menstrual cycle. It is the basic requirement of

**ASSIGNMENT :**

- Assignment on Menstrual Cycle.

**EVALUATION :**

- Unit Test, after complete of the unit about the various phases of menstruation cycle.

**BIBLIOGRAPHY :**

- C.S. Dawn text book of Gynaecology, Contraception & Demography 14<sup>th</sup> Edition 2003.
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 456-458
- P.V. publication – a text book of Anatomy & Physiology.
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## LESSON PLAN

Subject	: Bio-Science
Unit	: 10 (The Reproductive System)
Topic	: <b>Process Of Reproduction And Menopause.</b>
Group	: GNM I year
Place	: Class Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Demonstration
AV aids / instructional aids	: Black Board And Chalk, Chart,PPT.
Student Pre requisite	: The student should be able to understand the process of reproduction and menopause.
General Objective	: At the end of the class the student will be able to gain knowledge regarding process of Reproduction and menopause.
Specific Objectives	: At the end of the class the students will be able to a.) Describe the process of reproduction. b.) Describe menopause c.) Physiological changes in menopause and symptoms appear in menopause.
Review of previous class	: Ask Questions about reproduction, fertilization, gestation period, menopause.

**Introduction:** Ask the Students do you know about reproduction.

Ask general question about menopause.

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	20 min	Explain the process of reproduction on	<p style="text-align: center;"><b>PROCESS OF REPRODUCTION</b></p> <ul style="list-style-type: none"> <li>➤ Reproduction is the creation of a new individual from previously existing individuals.</li> <li>➤ The Union of sperm &amp; ovum in the essential step in process.</li> </ul> <p><b>PROCESS</b></p> <ul style="list-style-type: none"> <li>➤ Process of reproduction involves sexual intercourse between a man and a woman.</li> <li>➤ During sexual intercourse, the inter action between the male &amp; Female reproductive systems. The semen of male is ejaculated and expelled in the female genitalia. That result in fertilization of the woman's ovum by the man's sperm.</li> <li>➤ These are the specialized reproductive cells called gametes created in the process called meiosis.</li> <li>➤ While normal cells contain 46 chromosomes each gamete contain only 23 chromosomes. When these two cells merge into one zygote cell. Genetic recombination occurs and the new zygote contains 23 chromosomes</li> </ul>	<p>T: Explain the process of reproduction by PPT</p> <p>S: Observe and Take Notes</p>	<p>Q. Explain Fertilization and gestation Period?</p>

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
2	5 min	Define menopause	<p>from each parent giving them 23 pairs.</p> <ul style="list-style-type: none"> <li>➤ Fertilization is followed by implantation of zygote in uterus. The gestation period during which the fertilized egg get implanted into the uterus grows foetus and after completion of the pregnancy (normally 40 weeks) foetus expelled out in the outer.</li> <li>➤ Birth of baby is the final step of each reproduction.</li> </ul> <p style="text-align: center;"><b>MENOPAUSE</b></p> <ul style="list-style-type: none"> <li>➤ Menopause refers to age of final cessation of menstruation which usually occurs between 45-50 years of age.</li> <li>➤ Climacteric mean the period at which the woman gradually changes from the reproductive life into one of senescence.</li> <li>➤ These are physiological process due to cessation of ovarian follicular function.</li> <li>➤ The last few menstrual cycle are irregular and an</li> </ul>	<p>T: Explain by writing on black board and ppt</p> <p>S: listen attentively and take notes.</p>	What do u mean by menopause?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3	5 min	Explain the aetiology and timing of menopause	<p>ovulatory which stops gradually.</p> <p><b>Aetiology</b></p> <ul style="list-style-type: none"> <li>➤ Menopause occurs as results of exhaustion of egg from ovarian follicles and consequent oestrogen deprivation.</li> </ul> <p><b>Timing</b></p> <ul style="list-style-type: none"> <li>➤ Generally menopause occurs at the age of 45-50 years.</li> <li>➤ Premature menopause occurs before 35 year and delayed menopause at 55 year climacteric period gradually starts 2-3 years before and 2-5 year after menopause.</li> </ul>	<p>T: describe causes by writing on black board and ppt</p> <p>S: listen attentively and take notes.</p>	What is the cause of menopause?
4	10 min	Enlist physiological changes during menopause.	<p><b>PHYSIOLOGY CHANGES IN MENOPAUSE</b></p> <ul style="list-style-type: none"> <li>➤ Body weight decrease after 65 years.</li> <li>➤ Skin becomes less elastic and wrinkles appear.</li> <li>➤ Fat deposition on hip &amp; thigh.</li> <li>➤ Osteoporosis occurs due to post menopausal oestrogen insufficiency progesterone secretion from ovary</li> </ul>	<p>T: discuss changes by black board and ppt</p> <p>S: listen attentively and</p>	Enumerate the physiological changes occurs due to menopause?





**Summary : & Evaluation (10 min)**

- Process of reproduction.
- Menopause- Definition Aetiology, Physiological changes & Symptoms.

**Assignment :**

- Explain the process of reproduction define menopause & physiological changes.

**Evaluation :**

- Unit Test of 50 marks after completion of unit.

**Bibliography :**

- P.R. Asha Latha & G.Deepa- Text book of Anatomy & Physiology for Nurses.
- C.S. Dawn – Text Book of Gynaecology contraception & Demography IV Edition-2003.

# LESSON PLAN

Subject	: Bio-Science
Unit	: 10 (The Reproductive System)
Topic	: <b>Structure &amp; Function-Breast</b>
Group	: GNM First year
Place	: Classroom
Date & Time	: 60 minutes
Teaching method	: Lecture cum demonstration
AV aids / instructional aids	: Black board and chalk, chart, PPT, Anatomical Model.
Student Pre requisite	: The students should be able to understand the structure and functions of breast.
General Objective	: At the end of the class, the student will be able to gain knowledge regarding the structure of Breast and its function.

Specific Objectives: At the end of the class student will be able to understand.

- a) Description of breast
- b) Structure of breast
- c) Blood supply, nerve supply
- d) Functions of breast
- e) Abnormalities , disease and disorder of breast

Review of previous class: Ask questions regarding the structure and functions of breast.

**Introduction: 5 min** Ask the students Do you know about the structure of breast, parts of breast and its functions.

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
1.	15 min	Description of Breast	<p><b>BREAST</b></p> <ul style="list-style-type: none"> <li>➤ The two mammary glands are modified sudoriferous (sweat glands) that produce milk.</li> <li>➤ These are accessory glands of the female reproductive system.</li> <li>➤ They exist also in male but in only a rudimentary form.</li> </ul> <p><b>POSITION AND STRUCTURE OF BREAST:-</b></p> <ul style="list-style-type: none"> <li>➤ Present bilaterally in the pectoral region in both sexes.</li> <li>➤ After puberty the female breasts are will developed.</li> <li>➤ The adult female breast has a base, nipple, areola and an auxiliary tail.</li> </ul> <p>a.) Base</p> <ul style="list-style-type: none"> <li>➤ The base is circular, vertically; it extends from the 2<sup>nd</sup> to 6<sup>th</sup> ribs, in the midclavicular line.</li> <li>➤ Horizontally it extends from the lateral border of sternum to the mid-axillary line.</li> </ul>	<p>T. Explain by writing on the black board.</p> <p>S. Listen and take notes.</p>	<p>Q. Define the structure of breast.</p>

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ The base rests mainly on the pectorals major muscle and the pectoral fascia.</li> <li>➤ A retro mammary tissue intervenes between the base and the fascia covering the pectorals major muscles.</li> </ul> <p>b.) Nipple</p> <ul style="list-style-type: none"> <li>➤ The nipple is a conical projection below the centre of the breast.</li> <li>➤ It is pierced by 15-20 lactiferous ducts.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning Activity	Evaluation
2.	20 min	Structure of Breast	<ul style="list-style-type: none"> <li>➤ It has circularly and longitudinally arranged smooth muscles fibres.</li> <li>➤ The circular fibres erect the nipple for sucking and the longitudinal muscle retracts the nipple.</li> <li>➤ The nipple is richly innervated.</li> </ul> <p>c.) Areola</p> <ul style="list-style-type: none"> <li>➤ The areola is the pigmented circular area of skin around the base of the nipple.</li> <li>➤ Outer margin of the areola has modified sebaceous glands. They are enlarged during pregnancy and lactation and are known as “Montgomery’s tubercles”, their only secretions form a protective lubricant during lactation.</li> </ul> <p>d.) Axillary tail or Spence</p> <ul style="list-style-type: none"> <li>➤ It is a tail like projection from the upper outer quadrant of the breast into the axilla.</li> </ul> <p><b>STRUCTURE</b></p> <ul style="list-style-type: none"> <li>➤ The breast is made up of 3 components- Glandular tissue, Fibrous tissue ,fatty tissue</li> </ul>	<p>∴ PPT</p> <p>S: Observe and Take Notes.</p>	<p>Q. Explain the components of Breast?</p>

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b>a.) Glandular tissue</b></p> <ul style="list-style-type: none"> <li>➤ The glandular tissue consists of 15-20 pyramidal lobes, separated by adipose tissues.</li> <li>➤ Each lobe contains a number of glandular structure called lobules, where milk is produced. The lobules are composed of grape like clusters of milk secreting glands termed alveoli embedded in connective tissue.</li> <li>➤ Lobules open into tiny lactiferous ducts which drain milk towards the nipple.</li> <li>➤ Myoepithelial cells surround the alveoli, whose contraction helps propel milk towards the nipples.</li> <li>➤ When milk is being produced, it passes from alveoli into a series of secondary tubules. From here the milk enters the mammary ducts. Close to the nipple the mammary ducts expand to form sinuses called lactiferous sinuses, where some milk may be stored before draining into a lactiferous duct. This duct carries milk to exterior.</li> </ul> <p><b>b.) Fibrous tissue /connective tissue</b></p> <ul style="list-style-type: none"> <li>➤ It supports the lobes, connects the skin to the pectoral fascia. The suspensory ligaments of the breast run between the skin and</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3	5 min	Discuss Blood supply and lymph drainage and nerve supply of breast	<p>➤ fascia and support breast. These ligaments become looser with age or undue stress.</p> <p><b>c.) Fatty tissue</b></p> <p>➤ The interloper fatty tissue makes the breast rounded in contour.</p> <p>➤ The amount of adipose tissue determined the size of breast, not the amount of milk produced.</p> <p><b>BLOOD SUPPLY, LYMPH DRAINAGE AND NERVE SUPPLY:-</b></p> <ul style="list-style-type: none"> <li>- Arterial supply:- thoracic branches of the axillary arteries and from the internal mammary and ntercostal arteries.</li> <li>- Venous drainage:- axillary and mammary veins</li> <li>- Lymph drainage:- superficial axillary lymph vessels and nodes. Internal mammary nodes.</li> <li>- Nerve supply:- 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> thoracic nerves . Somatic sensory nerves endings in breast and around nipple.</li> </ul> <p><b>FUNCTION/ PHYSIOLOGY OF BREAST</b></p>	<p>T:- enumerate blood supply and nerve supply with power point</p> <p>S: takes down notes and listening attentively</p>	tell the arterial blood supply, venous drainage and nerve supply of breast?
4	10 min	Enlist the functions of breast	<p>➤ In female, breast serves as the mammary gland which produces and securities milk and feds infants.</p> <p>➤ Besides this, female breast also have social and sexual characteristics.</p>	<p>T:- enumerate blood supply and nerve supply with power point</p>	Listout the functions of breast?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
5	2 min	Enumerate the disease, abnormalities in breast	<ul style="list-style-type: none"> <li>➤ Breast are small and immature until puberty.</li> <li>➤ Growth and development under influence of estrogen and progesterone.</li> <li>➤ During pregnancy these hormones stimulates further growth</li> <li>➤ After the baby born the hormone prolactin stimulates the production of milk and the oxytocin causes ejection of milk by positive feedback mechanism when baby suck the nipple.</li> </ul> <p><b>Abnormalities / diseases / disorders in breast:-</b></p> <ul style="list-style-type: none"> <li>- Gynaecomastia:- enlargement of breast in men</li> <li>- Malignant tumor/ breast cancer</li> <li>- Mastitis</li> </ul>	<p>S: takes down notes and listening attentively</p> <p>T:-explain on ppt S;- listen and takes down notes</p>	Which are the abnormalities and diseases can occur in breast?



**Summary : & Evaluation (3 min)**

This chapter we have discussed about

- Description of Breast.
- Structure of Breast.
- Function of Breast.

Breast is an accessory reproductive part in female but it plays a vital role in feeding the baby after delivery.

**Assignment :**

- Explain the Structure of Breast with Diagram and its Functions.

**Evaluation :**

- Unit Test of 50 marks after completion of unit.

**Bibliography :**

- P.R. Asha Latha & G.Deepa- Text book of Anatomy & Physiology for Nurses-2<sup>nd</sup> Edition.
- S.S. Randhawa – Text Book of Biological Science. (Anatomy and Physiology)
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 458-59
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## LESSON PLAN

Subject	: Anatomy and Physiology
Topic	: <b>286 Structure of Male Reproductive Organs</b>
Group	: GNM I year
Place	: Class room and demonstration room
Time	: 60 minutes
Teaching method	: Lecture cum demonstration
A.V. Aids	: Black board and chalk, power point, anatomical models
Student Pre requisite	: The student should be able to identify structures of male reproductive system
General objective	: At the end of class the students will be able to gain knowledge regarding structures of male reproductive system

Specific objectives: At the end of class students will be able to:

1. List all organs of male reproductive system
2. Describe shape and structures
3. Describe anatomical position

Review of class: Ask the questions about male reproductive organs. Information regarding male reproductive system and structure.

### **Introduction:- 5 MIN**

The study of male reproductive system includes the various structures. The each structure perform their unique functions.

S.No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1.	3 mins	Enumerate the parts of male reproductive system.	<p>The male genitalia include:</p> <ul style="list-style-type: none"> <li>✓ The penis</li> <li>✓ The scrotum</li> <li>✓ The testis and epididymus</li> <li>✓ The spermatic cord</li> <li>✓ The vas deferens or ductus deferens</li> <li>✓ The seminal vesicle</li> <li>✓ The ejaculatory duct</li> <li>✓ The prostate</li> <li>✓ The urethra</li> </ul>	<p>T: list out on ppt and black board</p> <p>L: listens and takes note</p>	<p>Q: enlist the parts of male reproductive system?</p>

S No	Time	Specific objective	Content	Teaching learning activity	Evaluation
2.	5 mins	Structure of scrotum	<p>Scrotum is loose cutaneous fibromuscular sac. It is a pouch of skin, fibrous and connective tissue and dartos muscle. This muscle contracts under influence of cold, exercise and sexual stimulation.</p> <p>External scrotum is divided into right and left compartments by ridge or raphae. Each of which contains one testis, one epididymis and testicular end of spermatic cord. It lies below the symphysis pubis, in front of the upper part of the thighs and behind the penis.</p> <p>Layers of scrotum:</p> <ol style="list-style-type: none"> <li>1. Skin</li> <li>2. Dartos muscle</li> <li>3. The external spermatic cord</li> <li>4. The cremasteric fascia</li> <li>5. The internal fascia</li> </ol>	<p>T: powerpoint presentation</p> <p>L: listens and take note</p>	Q: explain structure of scrotum and testis

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3.	5 min	Discuss the position and size of testes.	<p style="text-align: center;"><b>TESTES:-</b></p> <p><b>POSITION AND SIZE</b> – The testes are the male reproductive gonads/ glands and are the equivalent of the ovaries in the females they are about 4.5cm long, 2.5cm wide and 3cm thick and are suspended in the scrotum by spermatic cord, they are surrounded by the three layers of tissue. 10-15 gm. Testes Develops in posterior abdominal wall and begin descent into scrotum through inguinal canal during seventh month of fetal development.</p> <p>The scrotum is a pouch of pigmented skin, fibrous and connective tissue and smooth muscles.</p> <p><b>1.Tunica vaginalis</b> – This is a double membrane, forming the outer covering of the testes and pelvic peritoneum. The testes develop in the lumbar region of the abdominal cavity just below the kidneys. They then descend in to the scrotum taking with them covering of peritoneum blood and lymph vessels, nerves and the deferent duct.</p> <p>The peritoneum eventually surrounds the testes in the scrotum and because detached from the abdominal peritoneum. Descent of the testes into the scrotum should be complete by the 8<sup>th</sup> month of foetal life.</p>	<p>T:- Explain position and size of testes with ppt and chart</p> <p>S:- listening and takes down notes</p>	Where the testes situated?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
4.	5 min	Explain structure of testes	<p><b>2.Tunica albugenia</b> – This is fibrous covering beneath the tunica vaginalis. In growths from septa. dividing the glandular structure of the testes into lobules.</p> <p><b>3.Tunica vasculosa</b> – This consists of a network of capillaries supported by delicate connecting tissue.</p> <p><b>STRUCTURE –</b></p> <ul style="list-style-type: none"> <li>-In each testes are 200-300 lobules, and within each lobule are 1-4 convoluted loop of germinal epithelial cells called seminiferous tubules, which produce sperm by spermatogenesis.</li> <li>-Sertoli cells (sustentacular cells) support and protect developing spermatogenic cells, nourish spermatocytes, spermatid and sperm. Sertoli cells mediate the effects of testosterone and fsh. Also control movement of spermatogenic cells and release sperm into lumen of seminiferous tubule. They produce fluid for sperm transport.</li> <li>-Between the tubules are group of interstitial cells (of leydig) that secretes the hormone testosterone after puberty.</li> <li>-At the upper pole of testes the tubules combine to form single tubules.</li> <li>-This tubule, about 6m, repeatedly folded and its packed into a mass called the <b>epididymis</b>. It leaves the scrotum as the <b>deferent duct</b> (vas deferens) in the spermatic cord. -Blood and lymph vessels pass to the testes in the spermatic cord.</li> </ul>	<p>T: Describe the structure of testes with ppt ad black board</p> <p>S:- listening attentively and takes down notes</p>	Explain the internal micro-structure of testes?

S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
5	2 min	Structure of epididymus	<p>This is comma shaped mass containing 3 parts: ahead, body and a tail. The sperms are stored in epididymis where they undergo final stages of maturation. It is 4 cm long lies along the posterior border of each testis.</p> <p><b>Spermatic cord:-</b></p> <p>Spermatic cord suspend the testis in scrotum. Spermatic cord passes through inguinal canal, emerges at superficial inguinal ring and descends within scrotum to the testis.</p> <p>Constituents of spermatic cord:</p> <ul style="list-style-type: none"> <li>➤ Ductus deferens and vas deferens is thick walled tube</li> <li>➤ Vein /Arteries: Testicular artery, Cremasteric artery, Artery to the ductus deferens, The pampiniform plexus of veins, testicular vein</li> <li>➤ Lymph vessels from testes</li> <li>➤ The genital branch of genitofemoral nerve and sympathetic plexus</li> <li>➤ Remains of processus vaginalis</li> </ul> <p>Cord covered with sheath of smooth muscles and connective and fibrous tissues ,extends through the inguinal canal and it is attached to testis on the posterior wall.</p>	<p>T: explain with board and chalk</p> <p>L: listens and take down notes</p>	<p>Q: explain about epididymus and spermatic cord</p>
6.	2 min	Spermatic cord			

S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
6	2 min	Deferent duct	<p><b>Deferent duct / vas deferens or also called seminal duct</b></p> <p>This is 45 cm long, thick walled muscular tube. It passes upward from the testes through the inguinal canal and ascends medially towards the posterior wall of the bladder where it is joined by the duct from the seminal vesicle to form the ejaculatory duct.</p>	<p>T:- discuss with PPt</p> <p>L:- listen and takes down notes</p>	
7	5 min	Seminal vesicle and ejaculatory duct	<p><b>SEMINAL VESICLE AND EJACULATORY DUCT:-</b></p> <p>The seminal vesicles are two small fibromuscular pouches. Seminal vesicle is thin walled pear shaped structure 3-5 cm long. It lies between fundus of bladder and rectum. It is lined with columnar epithelium.</p> <p>As its lower end each seminal vesicle opens into a short duct, which joins with the corresponding deferent duct to form an ejaculatory duct.</p> <p>Ejaculatory ducts are about 2.5 cm long. These are formed by union of duct of seminal vesicle and ductus deferens. They pass through the prostate gland and join the prostatic urethra.</p> <p>The ejaculatory duct eject sperm into the urethra just before the ejaculation, the powerful propulsion of semen from the urethra to the exterior.</p>	<p>T:- explain with PPt</p> <p>L:- listen and takes down notes</p>	



S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
8	5 min	Prostate gland	<b>PROSTATE GLAND:-</b> It lies in the antero-inferior part of pelvic cavity below neck of bladder, in front of the rectum and behind the symphysis pubis. It weighs around 8 gm and surrounds prostatic urethra. It progressively enlarges with age, weight about 40 gm by the age of 50 years.	T:- describe with PPt L:- listen and takes down notes	
9.	10 min	Urethra and penis	<b>URETHRA AND PENIS:-</b> <b>URETHRA:-</b> <ul style="list-style-type: none"> <li>- The male urethra provide common pathway for the flow of urine and semen. It is about 19-20 cm long and consists three part:-               <ul style="list-style-type: none"> <li>• Prostatic urethra:- originates at the urethral orifice of the bladder and passes through prostate gland</li> <li>• Membranous urethra:- shortest and narrowest part and extends from prostate gland to the bulb of penis, after passing through the perineal membrane.</li> <li>• Spongiose or penile urethra:- lies within the corpus spongiosum of the penis and terminates at the external urethral orifice in the gland penis.</li> </ul> </li> <li>- There are two urethral sphincter:- internal (smooth muscles) and</li> </ul>	T:- discuss with PPt L:- listen and takes down notes	

S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p>external (skeletal muscle)</p> <p><b>PENIS:-</b></p> <ul style="list-style-type: none"> <li>- The penis contains urethra, a passage way for ejaculation of semen and for urine excretion.</li> <li>- It is a cylindrical shaped and consists of root and shaft.</li> <li>- Externally visible and movable part</li> <li>- It is formed by three cylindrical mass of erectile tissue, bounded by fibrous tissue called tunica albugenia, covered with skin and has a rich blood supply.</li> <li>- Two lateral column called corpus cavernosa and the column between them , containing the urethra is the corpus spongiosum.</li> <li>- At the tip expands into triangular structure known as glans penis.</li> <li>- Just above the glans the skin is folded upon itself and forms a movable double layer, the fore skin or prepuce.</li> <li>- Arterial blood is supplied by deep, dorsal and bulbar arteries of the penis, branches from pudendal arteries. A series of vein drain blood to the internal pudendal and internal iliac vein.</li> <li>- The penis supplied by autonomic and somatic nerve, parasympathetic stimulation leads to filling of the spongy erectile tissue with blood ,</li> </ul>		

S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p>caused by arteriolar dialatation and venous constriction, which increases blood flow into the penis and obstruct outflow. The penis therefore becomes engorged and erects, essential for sexual intercourse.</p>		

**Summary and evaluation (10 mins)**

- List all organs of male reproductive system
- Describe their structure and anatomical position

**Assignment:** list each organ of male reproductive system and describe their structure with diagram

**Evaluation:** class test after completion of unit

**Bibliography:**

- Ashalatha P R. Textbook of Anatomy and Physiology for Nurses. First edition. JAYPEE BROTHERS Medical publishers. New Delhi.
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 459-63
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# LESSON PLAN

Subject	: Bio-science (Anatomy and Physiology)
Topic	: <b>Function of Male Reproductive System</b>
Group	: GNM I year
Place	: class room
Time	: 60 minutes
Teaching method	: Lecture cum demonstration
A.V. Aids	: Black board and chalk, powerpoint, chart
Student Pre-requisite	: Students should be able to understand specific function of each organ of Male Reproductive System
General objective	: At the end of class students will be able to gain knowledge regarding function of Male Reproductive System
Specific objective	: At the end of class students will be able to <ol style="list-style-type: none"><li>1. Explain Function Male Reproductive System</li><li>2. Describe function of each organ / part of male reproductive system.</li></ol>
Review of class	: - Ask question about organs of male reproductive system to know the level of knowledge of student about the male reproductive system.

**Introduction** :- the male reproductive system has scrotum, testes, spermatic cord, seminal vesicle, ejaculatory duct, prostate gland and penis with urethra. Each part of male reproductive system has their unique functions.

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1.	3 mins	Function of male reproductive system	<p>The purpose of the organs of male reproductive system is to perform following functions:</p> <ul style="list-style-type: none"> <li>● To produce, maintain, and transport sperm (male reproductive cells) and protective fluid (semen) or production , maturation and storage of spermatozoa.</li> <li>● To discharge sperm within female reproductive tract during copulation</li> <li>● To produce and secrete male sex hormones responsible for maintaining male reproductive system</li> </ul>	<p>T: listout the function with chart and ppt</p> <p>L: discuss and take notes</p>	Q: enumerate function of male reproductive system?
2.	6 mins	Explain the functions of Penis	<p>The body of penis is cylindrical in shape and consists of three chambers. These chambers are made up of special sponge like tissue. This tissue is filled contain large spaces which is filled by blood when a man is sexually aroused</p>	<p>T: discuss the function with chart and ppt</p> <p>L: discuss and take notes</p>	What are the functions of penis?

S .No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p><b>Anatomical basis of erection:</b></p> <p>When a male is sexually stimulated, smooth muscle in helicine arteries relaxes. As a result arteries straighten and their lumina enlarge. The cavernous spaces are filled with blood, dilate and become rigid.</p> <p>The ischiocavernous and bulbospongiosus muscles compress venous plexus and prevent return of venous blood. As a result, three corpora become enlarged, rigid and penis erects.</p> <p>Following orgasm penis returns to flaccid state. This results from sympathetic stimulation that causes constriction of smooth muscle</p>		
3.	5 mins	Discuss the functions of Scrotum	<p>Contraction of dartos muscle and cremasteric muscle causes testes to be drawn against body. In hot weather, scrotum relaxes providing a large surface area for dissipation of heat.</p> <p>Maintaining temperature is essential for spermatogenesis as it will be impaired by extreme cold or heat</p>	<p>T: explain the function with chart and ppt</p> <p>L: listen attentively and take notes</p>	Describe the functions of scrotum?

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
3	5 min	Discuss the functions of testes	<b>FUNCTIONS OF TESTES–</b> <ul style="list-style-type: none"> <li>➤ Spermatozoa (sperm) are produced in the seminiferous tubules of the testes, and mature as they pass through the long and convulated epididymis, where they are stored. FSH from the anterior pituitary stimulates sperm production.</li> <li>➤ A mature sperm has a head a body and a long whip like tail used nucleus containing its DNA.</li> <li>➤ It also contains the enzymes required to penetrate the outer layers of the ovum to reach and fuse with its nucleus. The body of the sperm is packed with mitochondria to fuel the propelling action of the tail that power of sperm along the female reproductive tract.</li> <li>➤ Successful spermatogenesis takes place at temp. About 3<sup>0</sup>c below normal body temperature.</li> <li>➤ The testes are cooled by their position outside the abdominal cavity and the thin outer covering of scrotum has very little insulating fat.</li> </ul>	T:- explain the functions of testes with ppt S:- listening and takes down notes	What are the functions of testes?



S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<p>➤ Sperm production in males begins at puberty and continues throughout life.</p> <p><b>Spermatogenesis :-</b></p> <ul style="list-style-type: none"> <li>- Spermatogonia is the most primitive cells. Each spermatogonium gives rise to 64 spermatozoa.</li> <li>- between spermatogonium to the development of spermatozoa there are four stages:- a. Spermatogonia, b. Spermatocyte, c. Spermatid, d. Spermatozoa</li> <li>- spermatogonium contains 46 chromosomes. From spermatogonium develops primary spermatocytes, by mitosis. From primary , by meiosis, develops the secondary spermatocytes (containing 23 chromosomes). From secondary spermatocytes , successively , spermatids , spermatozoa, all containing (23) chromosomes are formed.</li> <li>- Time taken for the development of spermatozoa in seminiferous tubules is 74 days.</li> </ul>		

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>- The spermatozoa within the seminiferous tubule are immature. Which enters in epididymis and stay for 2 month and become mature.</li> </ul> <p><b>Role of hormones in spermatogenesis:-</b></p> <ul style="list-style-type: none"> <li>- <b>GnRH</b> (gonadotropin releasing hormone) from hypothalamus stimulates anterior pituitary , causes producton of FSH and LH.</li> <li>- <b>FSH:-</b> acts on sertoli cells , which stimulates production of spermatocytes from spermatogonia</li> <li>- <b>LH:-</b> act on leydig cells for production of testosterone</li> <li>- Enzyme 5 alfa reductase converts testosterone into more potent androgen called DIHYDROTESTOSTERONE.</li> <li>- DHT and testosterone are responsible for development of sexual characteristics at puberty.</li> <li>- Inhibin secretion from sertoli cells inhibits secretion of FSH.</li> </ul>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
5.	3 mins	Epididymis	Sperms are stored in epididymis where they undergo final stage of maturation. During sexual arousal, contractions force sperm into vas deferens	T: listout the function with chart and ppt L: discuss and take notes	Q: explain cremasteric reflex
6.	3 mins	Spermatic cord	<p>Coverings of spermatic cord:</p> <ul style="list-style-type: none"> <li>➤ Innermost, internal spermatic fascia</li> <li>➤ Cremaster muscle</li> </ul> <p><i>Cremasteric reflex</i>- contraction of cremaster muscle can be produced by gently stroking the skin of upper, medial aspect of thigh. This area is supplied by ilioinguinal nerve (L1). This results in contraction muscle which is supplied by genitofemoral nerve (L1, L2)</p> <ul style="list-style-type: none"> <li>➤ External spermatic fascia</li> </ul>	T: listout the function with chart and ppt L: discuss and take notes	

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
7.	3 mins	Vas deferens or ductus deferens	It is around 45 cm long and transmits spermatozoa from epididymis to ejaculatory duct. Ejaculatory ducts are formed from fusion of seminal vesicles. It opens into urethra	T: lecture	Q: explain fluid composing semen
8.	5 mins	Seminal vesicle and ejaculatory ducts	<p>Seminal vesicle secrete a thick alkaline fluid, that mixes with sperms. This fluid provide most of the volume of seminal fluid or semen</p> <p>Semen- it is a milky opalescent mucoid fluid, which contains sperms and secretion of seminal vesicles, prostate, Cowper's glands and bulbourethral glands.</p> <p>Average volume of semen is 2.5-3.5 ml per ejaculation. Normal pH is 7.5. Each ml of ejaculate contains 60-100 million sperms out of which 80% or more are having normal morphology. After ejaculation sperms survive only for about 48 hours.</p>	L: listen and takes note	

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
9.	3 mins	Prostate gland	It contributes additional fluid to ejaculate. Prostate fluids help to nourish the sperm. Urethra runs through center of prostate gland	T: lecture	Q: explain function of prostate and urethra
10.	3 mins	Urethra	It is 18-20 cm long. In flaccid state it is S- shaped and becomes J- shaped when erect. It excretes urine normally and also ejaculate sperm during orgasm.	L: listens and take note	

**Summary and evaluation (10 mins):**

This chapter discussed about functions of male reproductive system

- List organs of male reproductive system with diagram
- Describe function of each organ

Assignment: list and describe function of male reproductive system

Evaluation: class test after completion of lecture

**Bibliography:**

- Ashalatha P R. Textbook of Anatomy and Physiology for Nurses. First edition. JAYPEE BROTHERS Medical publishers. New Delhi.
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n. 459-63
- P.V. publication – a text book of Anatomy & Physiology.
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n. 909-923

# LESSON PLAN

Subject	: Bio-Science
Unit	: Reproductive System
Topic	: <b>Reproductive health</b>
Group	: GNM I <sup>st</sup> year
Place	: Class-room
Date & Time	: 60 minutes
Teaching method	: Lecture cum demonstration
AV aids / instructional aids	: BLACK BOARD AND CHALK CHART and PPT
Student Pre requisite	: The student should be able to know about reproductive health.
General Objective	: Identify the leading indicators and programme component of reproductive health.
Specific Objectives	: 1. Describe disparities in reproductive health outcomes between countries and regions of the world. 2. Discuss major challenges to improving reproductive health. 3. Describe effective interventions to improve reproductive health.
<b>Review of previous class</b>	: ask student about reproductive system and Reproductive organs information regarding Female Reproductive system and male reproductive system.
<b>Introduction:</b> Ask the Students if you know about reproductive health, global indicators, programme components of Reproductive health, safe motherhood and effective strategies and interventions to active safe motherhood.	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	15 min	Identify the leading indicators and programme component of reproductive health.	<b>DEFINITION</b> <ul style="list-style-type: none"> <li>➤ Good sexual &amp; reproductive health is a state of complete physical mental and social well being not merely the absence of disease or infirmity in all matters relating to the reproductive systems and its functions and processes.</li> <li>➤ It implies that people are able to have a               <ol style="list-style-type: none"> <li>1.) satisfying and safe sex life</li> <li>2.) Ability to reproduce</li> <li>3.) Successful maternal &amp; infant survival &amp; outcomes</li> <li>4.) Freedom to control reproduction.</li> <li>5.) Information about &amp; access to safe, effective affordable method of family planning.</li> <li>6.) Ability to minimize gynaecologic disease throughout life.</li> <li>7.) ability to go through pregnancy and child birth safely with successful maternal and infant survival and outcome.</li> </ol> </li> </ul>	Explain student listen & take notes.	Ask question



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b>IMPORTANCE OF REPRODUCTIVE HEALTH</b></p> <ol style="list-style-type: none"> <li>1.) Reproductive health is human right stated in international law.</li> <li>2.) Reproductive health plays an important role in morbidity, mortality and life expectancy.</li> <li>3.) reproductive health problems are the leading causes of women's ill health and mortality worldwide.</li> </ol> <p><b>Description</b></p> <ul style="list-style-type: none"> <li>➤ Reproductive health refers to the diseases, disorders and conditions that affect the functions of male and female reproductive system during all stages of life.</li> <li>➤ Disorders of reproduction includes               <ol style="list-style-type: none"> <li>1.) Birth defect.</li> <li>2.) developmental disorders</li> <li>3.) Low Birth weight</li> <li>4.) Preterm birth</li> <li>5.) Reduce fertility</li> <li>6.) Impotence</li> <li>7.) Menstrual disorders</li> </ol> </li> </ul>	<p>Explain use black board and chalk</p> <p>Student listen and take notes.</p>	<p>List disorders of reproductions</p>

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	10 min	Programme components of reproductive health	<p>8.) Exposure to environmental pollution may pose the greatest threat to reproductive health.</p> <p>9.) Exposure to lead is associated with reduced fertility in both male and female.</p> <p>Exposure to mercury link to birth defects &amp; and disruptors. Chemical that appear to disrupt hormonal activity in human may contribute to problem with fertility, pregnancy and other aspect of reproduction</p> <ul style="list-style-type: none"> <li>➤ Safe Motherhood</li> <li>➤ Family planning</li> <li>➤ Sexual transmitted infection, HIV and AIDS.</li> <li>Gender base violence.</li> <li>➤ Fertility</li> <li>➤ Life expectancy</li> <li>➤ Perinatal mortality</li> <li>➤ Low birth weight</li> <li>➤ Maternal mortality</li> </ul>	<p>Explain with the help of power point.</p> <p>Explain with the help of power point.</p>	<p>Ask questions</p> <p>Ask questions</p>
3.	10 min	Global indicators of reproductive health.			

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15min	Effective Strategies & Intervention to achieve safe motherhood.	<ul style="list-style-type: none"> <li>➤ Focus Antenatal Care.</li> <li>➤ Minimizing delays.</li> <li>➤ Skilled attendant at birth.</li> <li>➤ pregnancy spacing.</li> </ul>	Explain with the help of power point.	

**Summary : & Evaluation (10 min)**

- Define Reproductive Health.
- Importance of Reproductive Health.
- Describe Effective interventions to improve reproductive health.

**Assignment :**

- Briefly Describe about Reproductive Health.

**Evaluation :**

- Take the unit test, after the completion of the unit.

**Bibliography :**

- A comprehensive text book of midwifery ANNAMMA JACOD II Edition 2008.
- Text books of obstetrics – DC DUTTA 7<sup>th</sup> Edition including perinatology and contraception.
- Ashalatha P R. Textbook of Anatomy and Physiology for Nurses. First edition. JAYPEE BROTHERS Medical publishers. New Delhi.
- Waugh A. And Grant A., “Ross & Wilson – Anatomy & physiology in health and illness, Churchill livingstone Elsevier, 12<sup>th</sup> edition, 2014, p.n.
- P.V. publication – a text book of Anatomy & Physiology.
- Tortora Gerard J., Grabowski S.R. , “ principles of anatomy and physiology” Benzamins Cummins, 8<sup>th</sup> edition 1999, p.n.

## LESSON PLAN

Subject	: ANATOMY & PHYSIOLOGY
Unit	: XI The Nervous System
Topic	Structure of Nerves (No. 289)
Group	: I <sup>st</sup> Year GNM Students
Place	: Class-Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion.
AV aids / instructional aids	: Black board and chalk, .LED Projector
Student Pre requisite	: The students have an understanding about neuron and its functions.

General Objective : At the end of class the students will be able to gain knowledge regarding Structure of Nerves system successfully.

Specific Objectives : At the end of class the students will be able to-

- Define nerve.
- Enlist part of Nerve.
- Explain structure of nerves.
- Describe the Neuron

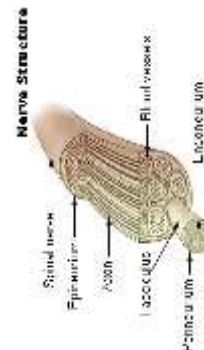
Review of previous clas : Are you remember the types of neuron structurally and functionally.

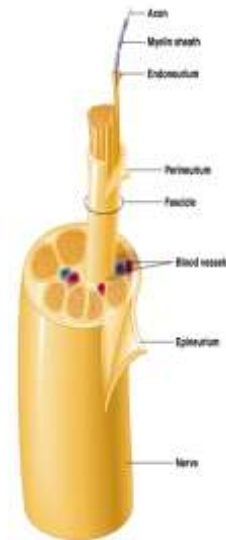
### Introduction:

This functions like a telephone system. With the brain as the head office, and nerves like the telephone wires communication takes place with all parts of the body. By means of numerous messages sent and received, the various tissues and organs of the body work in harmony.

Any one tell me what is nerves? what exactly the nerves is, now today we will discuss about .


S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10Min	Define Nerve	<b>Definition:</b> <ul style="list-style-type: none"> <li>➤ A <b>nerve</b> is an enclosed, cable-like bundle of axons (nerve fibers, the long and slender projections of neurons) in the peripheral nervous system. A nerve provides a common pathway for the electrochemical nerve impulses that are transmitted along each of the axons to peripheral organs .</li> <li>➤ In the central nervous system, the analogous structures are known as tracts. Neurons are sometimes called nerve cells, though this term is potentially misleading since many neurons do not form nerves, and nerves also include non-neuronal Schwann cells that coat the axons in myelin</li> </ul>	T: Define Nerves with help of black board and chalk	Q: Define Nerves?
2.	10Min	Enlist part of Nerves	<b>Part of Nerves:</b> <ul style="list-style-type: none"> <li>➤ Bundle of Axons</li> <li>➤ Connective tissue layers <ul style="list-style-type: none"> <li>i- Endoneurion</li> <li>ii- Perineurium.</li> <li>iii-Epineurium</li> </ul> </li> </ul>	T: Enlist part of Nerves with help of black board and chalk	Q: Enlist various part of Nerves?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	25Min	Explain structure of nerves	<p><b>structure of nerves:</b></p> <ul style="list-style-type: none"> <li>➤ Each nerve is a cord like structure containing bundles of axons.</li> <li>➤ Within a nerve, each axon is surrounded by a layer of connective tissue called the endoneurium. The endoneurium consists of an inner sleeve of material called the glycocalyx and a mesh of collagen. Nerves are bundled along with blood vessels, which provide essential nutrients and energy to the enclosed, and metabolically demanding, neurons. Within the endoneurium, individual nerve fibers are surrounded by a liquid called the endoneurial fluid. The endoneurium has properties analogous to the blood-brain barrier. It prevents certain molecules from crossing from the blood into the endoneurial fluid. In this respect, endoneurial fluid is similar to cerebrospinal fluid in the central nervous system.</li> <li>➤ The axons are bundled together into groups called fascicles,</li> <li>➤ Each fascicle is wrapped in a layer of connective tissue called</li> </ul>	<p>T: Explain structure of nerves with help of projector</p> 	Q: Explain the structure of Nerves?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>the perineurium.</p> <ul style="list-style-type: none"> <li>➤ Finally, the entire nerve is wrapped in a layer of connective tissue called the epineurium.</li> <li>➤ A nerve is the primary structure of the peripheral nervous system (PNS) that encloses the axons of peripheral neurons.</li> <li>➤ A nerve provides a structured pathway that supports neuron function.</li> <li>➤ A nerve consists of many structures including axons, glycocalyx, endoneurial fluid, endoneurium, perineurium, and epineurium.</li> <li>➤ Magnetic resonance neurography is a technology used to detect nerve damage.</li> <li>➤ The axons are bundled together into groups called fascicles, and each fascicle is wrapped in a layer of connective tissue called the perineurium.</li> <li>➤ Within the endoneurium, individual nerve fibers are surrounded by a liquid called the <i>endoneurial fluid</i>.</li> <li>➤ It prevents certain molecules from crossing from the blood into the <i>endoneurial fluid</i>.</li> </ul>	 <p>The diagram illustrates the hierarchical structure of a nerve. At the top, an 'Axon' is shown, surrounded by a 'Myelin sheath' and an 'Endoneurium'. Below this, a 'Fascicle' is depicted, which is a bundle of axons. The fascicle is surrounded by a 'Perineurium' layer. Within the fascicle, 'Blood vessels' are visible. The entire nerve is encased in an 'Epineurium' layer. The bottom part of the diagram shows the 'Nerve' as a whole structure.</p>	



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15Min	Describe the Neuron	<ul style="list-style-type: none"> <li>➤ This increase <i>in fluid</i> can be visualized using magnetic resonance neurography to diagnose nerve damage</li> </ul> <p><b>Neuron:</b></p> <ul style="list-style-type: none"> <li>➤ The nerve cell or neuron is the functional unit of the nervous system.</li> <li>➤ Despite the awesome complexity of the nervous system, it consists of only two principal types of cells: neurons and neuroglia.</li> <li>➤ Most electrical conduction in the body is due to the transmission of impulses by the neuron. They convert stimuli into electrical signals called action potentials (nerve impulses) and conduct these action potentials to other neurons, to muscle tissue, or to glands.</li> <li>➤ The neuron consists of branched structures called dendrites. Most neurons consist of three basic parts: a cell body and two kinds of cell processes dendrites and axons. The <b>cell body</b> contains the nucleus and other organelles. <b>Dendrites</b> (<i>dendr- _ tree</i>) are tapering, highly branched, and usually short cell processes (extensions).</li> <li>➤ The <b>axon</b> (<i>axo- _ axis</i>) of a neuron is a</li> </ul>	<p>T: Enlist part of Neuron with help of black board and chalk</p>	<p>Q: Describe the part and function of Neuron</p>

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>single, thin, cylindrical process that may be very long. It is the output portion of a neuron, conducting nerve impulses toward another neuron or to some other tissue.</p> <ul style="list-style-type: none"> <li>➤ The dendrites are the major receiving or input portion of a neuron.</li> <li>➤ The main portion of the nerve cell is called the soma or nerve cell body, and the elongated part of the neuron is the axon.</li> <li>➤ Two neurons are connected by gaps called synapses.</li> <li>➤ The nerve cell body is the metabolic center of the cell consisting of a nucleus, an endoplasmic reticulum called the Nissl bodies, and a region where the axon attaches called the axon hillock.</li> </ul>		

**Summary : (5 min)**

- To day we learn about Structure of Nerves and its part like axons , connective tissue layers . If any one have any question please tell me so we can again discuss and understand.

**Assignment :**

- Describe the structure of nerves?

**Evaluation :**

Class test once the topic (structure of nerve ) is completed.

**Bibliography :**

- Ross and Wilson anatomy and physiology in health and illness.
- Tortora, Principles of anatomy and Physiology.

## LESSON PLAN

Subject : Bio- Science – Anatomy & Physiology

Unit : The nervous system.

Topic : , Types of nerves.

Group : GNM First year

Place : Class- Room & Demonstration Room.

Date & Time : 60 minutes

Teaching method : Lecture cum Demonstration

AV aids / instructional aids : Black Board, Chalk, LCD, Computer, PPT.

Student Pre requisite : The student should be able to gain knowledge about Nerve & Nervous system..

General Objective : At the end of the class the student will be able to gain knowledge about Nerve & Types of Nerves.

Specific Objectives : At the end of the class the students will be able to –

- Define Neuron.
- Define nerve
- Explain the coverings tissue of bundles of nerve fibres.
- Describe the types of nerves.

Review of previous class : Ask questions regarding neurone and nerve.

### Introduction:

- Ask the student if they know definition of nerve.
- Also mention the objective of the lesson to the students here.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Define neurone	<p>Neurones</p> <ul style="list-style-type: none"> <li>➤ Neurones is also called nerve cells.</li> <li>➤ Neurone one the working units of the nervous system that generate and transmit nerve impulses.</li> <li>➤ Neurones are supported by connective tissue, collectively known as neuroglia, which is formed from different types of glial cells.</li> <li>➤ Each neurone consists of a cell body and its processes, one axon and many dendrites.</li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Evaluation what is neurones.
2.	10 min	Define Nerve	<p>Nerves</p> <ul style="list-style-type: none"> <li>➤ A Nerve consists of numerous neurones collected into bundles.</li> <li>➤ Bundles of nerve fibres in the central nervous system are known as tracts.</li> <li>➤ A whitish fibre or bundle of fibres in the body that transmits impulses of sensation to the brain or spinal cord, and impulses from these to the muscles and organs.</li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Q. What is nerve & Explain about nerve?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	10 min	Explain the covering tissue of bundles of nerve fibres.	<ul style="list-style-type: none"> <li>➤ Each bundle has several coverings of protective connective tissue –               <ol style="list-style-type: none"> <li>1. Endoneurium is a delicate tissue, surrounding each individual fibre.</li> <li>2. Perineurium is a smooth connective tissue, surrounding bundles of fibres.</li> <li>3. Epineurium is the fibrous tissue which surrounding and encloses a number of bundles of nerve fibres.</li> </ol> </li> <li>➤ most large nerves are covered by epineurium..</li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Q. Explain covering Tissue of nerves?
4.	20 min	Describe the types of nerve	<ul style="list-style-type: none"> <li>➤ There three types of nerves in the central nervous system –               <ol style="list-style-type: none"> <li>1. Sensory or afferent nerves - Sensory nerves carry information from the body to the spinal cord. The impulses may then pass to the brain or to connector neurones of reflex area in the spinal cord.</li> </ol> </li> </ul>		Explain the types of nerve?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>2. Motor or efferent nerves –</p> <ul style="list-style-type: none"> <li>➤ Motor nerves originate in the brain, spinal cord and autonomic ganglia. They transmit impulses to the muscles &amp; glands.</li> <li>➤ There are two types:               <ol style="list-style-type: none"> <li>1. Somatic nerves</li> <li>2. Autonomic nerves</li> <li>3. Mixed nerves or autonomic nerves</li> </ol> </li> <li>➤ Autonomic nerves control involuntary or semi voluntary function, such as heart rate, digestion, sweating etc.</li> </ul>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ What is neurone?</li> <li>➤ Explain about nerve?</li> <li>➤ Describe the types of neurones?</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Explain type of nerve?</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Unit test for 50 marks once the unit completed.</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Ross and Wilson .</li> <li>➤ B.D.C. Nourishing.</li> </ul>



## LESSON PLAN

Subject : Bio- Science – Anatomy & Physiology

Unit : The nervous system.

Topic : Function of nerves.

Group : GNM First year

Place : Class- Room & Demonstration Room.

Date & Time : 60 minutes

Teaching method : Lecture cum Demonstration

AV aids / instructional aids : Black Board, Chalk, LCD, Computer, PPT.

Student Pre requisite : The student should be able to gain knowledge about Function of Nerve & types of Nerve

General Objective : At the end of the class the student will be able to gain knowledge about the function of Nerve.

Specific Objectives : At the end of the class the students will be able to –

- Define nerve
- Explain the types of nerves.

Review of previous class : Ask questions regarding nerve & types of nerves.

### Introduction:

- Ask the student if they know Function of nerve.
- Also mention the objective of the lesson to the students here.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	15 min	Define Nerve	<p>Nerves</p> <ul style="list-style-type: none"> <li>➤ A Nerve consists of numerous axons of neurones collected into bundles.</li> <li>➤ Bundles of nerve fibres in the central nervous system are known as tracts.</li> <li>➤ A whitish fibre or bundle of fibres in the body that transmits impulses of sensation to the brain or spinal cord, and impulses from these to the muscles and organs.</li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Q. What is nerve?
2.	15 min	Describe the types of nerve	<ul style="list-style-type: none"> <li>➤ There are three types of nerves in the central nervous system –               <ol style="list-style-type: none"> <li>1. Sensory or afferent nerves</li> <li>2. Motor or efferent nerves</li> <li>3. Mixed nerve</li> </ol> </li> </ul>	<p>T: Explain with the help of chart.</p> <p>S: Listen carefully and write down Notes.</p>	What are the various types of nerve?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	Describe the function of nerve.	<ul style="list-style-type: none"> <li>➤ A nerve is a fibre that connects the brain and spinal cord with various part of the body. nerves conduct impulses from the brain, spinal cord to these organs as well as conducting impulses from the receptor organs back to the brain or spinal cord.</li> <li>➤ Sensory or afferent nerves send messages from parts of the body, such as skin and muscles, to the spinal cord and brain the information is then processed to let you feel pain and other sensations. Sensory nerves in the skin help you indentify if an object is sharp, rough or smooth, hot or cold or if a body part is still or in motion.</li> <li>➤ Motor of efferent nerves send impulses from the brain and spinal cord to all of the muscles in the body. These nerves control muscles contraction allowing movements and activities such as wiggling your fingers, walking, catching a base ball.</li> <li>➤ Motor nerves are of three types –               <ol style="list-style-type: none"> <li>1. Somatic nerves – Involved in voluntary and reflex skeletal muscles contraction.</li> </ol> </li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Q. What are the various function of the nerve?
4.	20 min				

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ol style="list-style-type: none"> <li>2. Autonomic nerves – (Sympathetic and Parasympathetic) – Involved in cardiac and smooth muscle contraction and glandular secretion.</li> <li>3. Mixed or Autonomic nerves control involuntary or semi voluntary functions, such as heart rate, blood pressure, digestion, temperature regulation and sweating.</li> </ol>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ Define nerve?</li> <li>➤ Type of nerve?</li> <li>➤ Various function of nerve?</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ What are the various function of nerve?</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Unit test for so marks once the unit is complete.</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Rose &amp; Wilson etc.</li> </ul>

## LESSON PLAN

Subject	: ANATOMY & PHYSIOLOGY
Unit	: XI The Nervous System
Topic	: Brain
Group	: I <sup>st</sup> Year GNM Students
Place	: Class-Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion.
AV aids / instructional aids	: Black board and chalk, .LED Projector
Student Pre requisite	: The students have an understanding about types of nerves and central nerves system.

General Objective : At the end of class the students will be able to gain knowledge regarding brain and its Structure and functions successfully.

Specific Objectives : At the end of class the students will be able to-

- Define brain.
- Enlist major part of brain.
- Explain structure of brain.
- Describe Function of major brain parts.
- Explain circle of willis
- Explain the Ventricles of the brain and the cerebrospinal fluid.



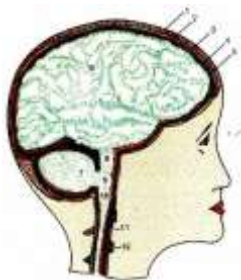
Review of previous clas : Are you remember the types of neuron structurally and functionally.

### **Introduction:**

This functions like a telephone exchange system. With the brain as the head office (Telephone Exchange), and nerves like the telephone wires communication takes place with all parts of the body. By means of numerous messages sent and received, the various tissues and organs of the body work in harmony.

Any one tell me what is brain? what exactly the brain is, now today we will discuss about it.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5Min	Define Brain	<b>Definition</b> <ul style="list-style-type: none"> <li>➤ The brain, one of our largest organs. brain weighs on average about 1.3–1.5 kg (2.9–3.3 lb), or about 2% of total body weight</li> <li>➤ The CNS as its name implies, is centrally located Its one major structures is the brain,it found along the midsagittal plane of the body. The brain is protected in the cranial cavity of the skull, protective membranes called meninges, The meninges are then surrounded by bone.</li> </ul>	T: Define Nerves with help of black board and chalk	Q: Define Nerves?
2.	5Min	Enlist major part of the brain	<b>Major part of the brain</b> <ul style="list-style-type: none"> <li>i)The forebrain include cerebrum, Thalamus and Hypothalamus</li> <li>ii) The midbrain</li> <li>iii) The hindbrain include cerebellum, Pons varolli and Medulla oblongata</li> <li>iv) The brain stem - consisting of pons and medulla oblongata</li> </ul>	T: Enlist part of Nerves with help of black board and chalk	Q: Enlist various part of Nerves?
3.	20Min	Explain structure of Brain	<b>Structure of Brain</b> <p><b>A)The Forebrain</b> – its content major three part</p> <ul style="list-style-type: none"> <li>➤ <b>i)Hypothalamus.</b> The hypothalamus, as its name suggests, is located inferior to the thalamus. The posterior pituitary gland, the stalk that attaches it to the undersurface</li> </ul>	T: Explain structure of Brain with help of projector	Q: Explain the structure of Brain?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>of the brain, and areas of gray matter located in the sidewalls of a fluid-filled space called the third ventricle are extensions of the hypothalamus. Identify the pituitary gland and the hypothalamus. the hypothalamus.</p> <p>➤ <b>ii) Thalamus</b> - Just superior to the hypothalamus is a dumbbell shaped section or largely gray matter called the thalamus. Each enlarged end of the dumbbell lies in a lateral wall of the third ventricle. The thin center section of the thalamus passes from left to right through the third ventricle. The thalamus is composed chiefly of dendrites and cell bodies of neurons that have axons extending up to the sensory areas of the cerebrum.</p> <p>➤ <b>iii) Cerebrum</b> - The cerebrum is the largest and uppermost part of the brain. If we look at the outer surface of the cerebrum, the first features you would notice might be its many ridges and grooves. The ridges are called convolutions or gyri, and the grooves are called sulci. The deepest sulci are called fissures the longitudinal fissure divides the cerebrum into right and left halves or hemispheres. These halves are almost separate structures except for their lower</p>	   <ol style="list-style-type: none"> <li>1. Bone</li> <li>2. Dura mater</li> <li>3. Arachnoid</li> <li>4. Theca</li> <li>5. Pia mater</li> </ol>	



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>midportions, which are connected by a structure called the corpus callosum. Two deep sulci subdivide each cerebral hemisphere into four major lobes and each lobe into numerous convolutions. The lobes are named for the bones that lie over them: the frontal lobe, the parietal lobe, the temporal lobe, and the occipital lobe. A thin layer of gray matter, made up of neuron dendrites and cell bodies, composes the surface of the cerebrum. Its name is the cerebral cortex. White matter made up of bundles of neuronal fibers (tracts), composes most of the interior of the cerebrum. Within this white matter, however, are a few islands of gray matter known as the basal ganglia, whose functioning is essential for producing automatic movements and postures.</p> <p>Parkinson's disease is a disease of the basal ganglia. Because shaking or tremors are common symptoms of Parkinson's disease, it is also called "shakingpalsy."</p> <p><b>B) The midbrain</b> - The midbrain is the area of the brain situated around the cerebral aqueduct between the cerebrum above and the pons below. It consists of groups of cell bodies and nerve fibres (tracts) which connect the cerebrum with lower parts of the brain and</p>	6. Cerebrum 7. Cerebellum. 8. Mid-brain 9. Pons varolii 10. Medulla oblongata 11. Spinal Cord 12. Vertebra	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>with the spinal cord. The cell bodies act as relay stations for the ascending and descending nerve fibres.</p> <p><b>C) The hindbrain</b> – its back portion of the brain content major following structures-</p> <p><b>Pons-</b> The pons is situated in front of the cerebellum, below the midbrain and above the medulla oblongata. It consists mainly of nerve fibres which form a bridge between the two hemispheres of the cerebellum, and of fibres passing between the higher levels of the brain and the spinal cord. There are groups of cells within the pons which act as relay stations and some of these are associated with the cranial nerve. The anatomical structure of the pons differs from that of the cerebrum in that the cell bodies (grey matter) lie deeply and the nerve fibres are on the surface.</p> <p><b>Medulla oblongata-</b>The medulla oblongata extends from the pons above and is continuous with the spinal cord below. It is about 2.5 cm long and it lies just within the cranium above the foramen magnum. Its anterior and posterior surfaces are marked by central fissures. The outer aspect is composed of white matter which passes between the brain and the spinal cord, and grey matter lies centrally. Some cells constitute relay stations for sensory nerves</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>passing from the spinal cord to the cerebrum.</p> <p><b>Cerebellum-</b> The cerebellum is the second largest part of the human brain. It lies under the occipital lobe of the cerebrum. In the cerebellum, gray matter composes the outer layer, and white matter composes the bulk of the interior.</p> <p><b>Brain Stem-</b>The lowest part of the brain stem is the medulla oblongata. Immediately superior to the medulla lies the pons and superior to that the midbrain. Together these three structures are called the brain stem The medulla oblongata is an enlarged, upward extension of the spinal cord. It lies just inside the cranial cavity superior to the large hole in the occipital bone called the foramen magnum. Like the spinal cord, the medulla consists of gray and white matter, but their arrangement differs in the two organs. In the medulla, bits of gray matter mix closely and intricately with white matter to form the reticular formation (reticular means "netlike"). In the spinal cord, gray and white matter does not intermingle; gray matter forms the interior core of the cord, and white matter surrounds it. The pons and midbrain, like the medulla, consist of white matter and scattered bits of gray matter.</p> <p><b>Diencephalon-</b> The diencephalon is a small but important part of the brain located between the</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15Min	Describe Function of major brain parts.	<p>midbrain inferiorly and the cerebrum superiorly. It consists of two major structures: the hypothalamus and the thalamus. The ventricles of the diencephalons is the 3rd ventricle.</p> <p><b>Hypothalamus function-</b> its contribution to healthy survival; it is one of the most important brain structures. Impulses from neurons whose dendrites and cell bodies lie in the hypothalamus are conducted by their axons to neurons located in the spinal cord, and many of these impulses are then relayed to muscles and glands all over the body. Thus the hypothalamus exerts a major control over virtually all-internal organs. Among the vital functions that it helps control are the heartbeat, constriction and dilation of blood vessels, and contractions of the stomach and intestines. Some neurons in the hypothalamus function in a surprising way; they make the hormones that the posterior pituitary gland secretes into the blood. Because of one of these hormones (called antidiuretic hormone or ADH) affects the volume of urine excreted, the hypothalamus plays essential role in maintaining the body's water balance. Some of the neurons in the hypothalamus function as endocrine glands. Their axons secrete chemicals called releasing hormones into the blood,</p>	T: Describe Function of major brain parts.	Q. Explain the Function of brain parts?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>which then carries them to the anterior pituitary gland. Releasing hormones, as their name suggests, control the release of certain anterior pituitary hormones. These in turn influence the hormone secretion of other endocrine glands. Thus the hypothalamus indirectly helps control the functioning of every cell in the body.</p> <p>The <b>hypothalamus</b> is a crucial part of the mechanism for maintaining body temperature. Therefore a marked elevation in body temperature in the absence of disease frequently characterizes injuries or other abnormalities of the hypothalamus. In addition, this important center is involved in functions such as the regulation of water balance; sleep cycles, and the control of appetite and many emotions involved in pleasure, fear, anger, sexual arousal, and pain.</p> <p><b>Thalamus Function</b> It performs the following functions :</p> <ol style="list-style-type: none"> <li>1. It helps produce sensations. Its neurons relay impulses to the cerebral cortex from the sense organ of the body.</li> <li>2. It associates sensations with emotions. Almost all sensations are accompanied by a feeling of some degree of pleasantness or unpleasantness. The way that these pleasant and unpleasant feelings are produced is unknown except that they seem to be associated with the arrival of sensory impulses in</li> </ol>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>thalamus.</p> <p>3. It plays a part in the so -called arousal or alerting mechanism.</p> <p>4. It contains important nuclei such as medial geniculate which is responsible for auditory sense and lateral geniculate which is responsible for vision.</p> <p><b>Cerebrum Function</b></p> <p>1) <b>Frontal lobe :-</b></p> <ul style="list-style-type: none"> <li>• □ motor centres controlling voluntary muscles.</li> <li>• speech centre</li> <li>• □ □ mental powers such as memory, intelligence and will</li> </ul> <p>2) <b>Parietal lobe :-</b> The sensory centres for sensations of touch, pain, heat, cold and pressure</p> <p>3) <b>Temporal lobe :-</b> For hearing</p> <p>4) <b>Occipital lobe :-</b> For vision (sight)</p> <p><b>Cerebellum Function.</b> Most of our knowledge about cerebellar functions has come from observing patients who have some sort of disease of the cerebellum and from animals who have had the cerebellum removed. From such observations, we know that the cerebellum plays an essential part in the production of normal movements. Perhaps a few examples will make this clear. A patient who has a tumor of the cerebellum frequently loses balance and may topple over and reel like a drunken person</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5.	10Min	Explain the Ventricles of the brain and the cerebrospinal fluid	<p>when walking. It may be impossible to coordinate muscles normally. Frequent complaints about being clumsy and unable to even drive a nail or draw a straight line are typical. With the loss of normal cerebellar functioning, the ability to make precise movements is lost. The general functions of the cerebellum, then, are to produce smooth coordinated movements, maintain equilibrium, and sustain normal postures.</p> <p><b>Ventricles of the brain-</b></p> <ul style="list-style-type: none"> <li>• Lateral ventricles right and left</li> <li>• Third ventricle</li> <li>• Fourth ventricle</li> </ul> <p><b>Cerebrospinal fluid-</b></p> <p>Cerebrospinal fluid is secreted into each ventricle of the brain by choroid plexuses. These are vascular areas where there is a proliferation of blood vessels surrounded by ependymal cells in the lining of ventricle walls. CSF is secreted continuously at a rate of about 0.5 ml per minute, i.e. 720 ml per day. The CSF normal pressure is 60 to 140 water. The amount around the brain and spinal cord remains fairly constant at about 120 ml, which means that absorption keeps pace with secretion. CSF pressure may be measured using a vertical tube attached to a lumbar puncture needle. It remains fairly constant at about 10 cmH<sub>2</sub>O when the individual is lying on his side and about 30 cmH<sub>2</sub>O when sitting up. CSF</p>	T: Explain the Ventricles of the brain and the cerebrospinal fluid	Q. Explain the Ventricles of the brain and the cerebrospinal fluid?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>is a clear, slightly alkaline fluid with a specific gravity of 1.005, consisting of-</p> <ul style="list-style-type: none"> <li>• water</li> <li>• mineral salts</li> <li>• glucose</li> <li>• plasma proteins: small amounts of albumin and globulin</li> <li>• creatinine small amounts</li> <li>• urea small amounts</li> <li>• a few leukocytes.</li> </ul> <p><b>Functions of cerebrospinal fluid</b></p> <ul style="list-style-type: none"> <li>• It supports and protects the brain and spinal cord.</li> <li>• It maintains a uniform pressure around these delicate structures.</li> <li>• It acts as a cushion and shock absorber between the brain and the cranial bones.</li> <li>• It keeps the brain and spinal cord moist and there may be interchange of substances between CSF and nerve cells, such as nutrients and waste products.</li> </ul>		



Summary : (5min)

- To day we learn about brain and its Structure and its part and function of majou parts like cerebellum , hypothalamus, CSF . If any one have any question please tell me so we can again discuss and understand.

Assignment :

- Describe the structure and function of brain and CSF?

Evaluation :

Class test once the topic (Brain ) is completed.

Bibliography :

- Ross and Wilson anatomy and physiology in health and illness.
- Tortora, Principles of anatomy and Physiology.

## LESSON PLAN

Subject : Bio- Science – Anatomy & Physiology

Unit : The nervous system.

Topic : Cranial nerves

Group : GNM First year

Place : Class- Room & Demonstration Room.

Date & Time : 60 minutes

Teaching method : Lecture cum Demonstration

AV aids / instructional aids : Black Board, Chalk, LCD, Computer, PPT.

Student Pre requisite : The student should be able to gain knowledge about various types of Nerve

General Objective : At the end of the class the student will be able to gain knowledge about Cranial nerves.

Specific Objectives : At the end of the class the students will be able to –

- Define cranial nerve
- Enlist various type of cranial nerves.
- Explain types & function of cranial nerves.

Review of previous class : Ask questions regarding types of nerve & function of nerves.

### Introduction:

- Ask the student if they know any one type of Nerve.
- Also mention the objective of the lesson to the students here.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Define Cranial Nerves.	<p>Cranial Nerves</p> <ul style="list-style-type: none"> <li>➤ The cranial nerves are the 12 pairs of nerves that leave the brain via their own individual apertures in the skull.</li> <li>➤ Their names suggest their distribution or function, which in the main, is generally related to the head &amp; neck.</li> </ul>	<p>T: Explain with Black board.</p> <p>S: Takes Notes</p>	Q. What is cranial nerve?
2.	15 min	Enlist various cranial nerves	<ul style="list-style-type: none"> <li>➤ They are numbered using roman numbers according to the order they connect to the brain, starting anteriorly. They are –               <ol style="list-style-type: none"> <li>1. Olfactory</li> <li>2. Optic</li> <li>3. Oculomotor</li> <li>4. trochlear</li> <li>5. Trigeminal</li> <li>6. Abducens</li> <li>7. Facial</li> <li>8. Vestibulocochlear (auditory)</li> <li>9. Glosso pharyngeal</li> <li>10. Vagus</li> <li>11. Accessory</li> <li>12. Hypoglossal</li> </ol> </li> </ul>	<p>T: Explain with the PPT.</p> <p>S: Listen &amp; take Notes.</p>	What are the various cranial nerves?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	30 min	Explain types & Functions of cranial nerves	<ul style="list-style-type: none"> <li>➤ Olfactory Nerves Type – Sensory Functions – Sense of smell</li> <li>➤ Optic Nerves Type – Sensory Function – Vision also called eyesight approx a million nerve fibres that receive information from the rod and cone cells of the retina.</li> <li>➤ Oculomotor nerves Type – mixed, mainly motor Function – moves the eyeball &amp; eyelid, adjusts the lens of the eye for near vision and constricts the pupil of the eye via motor fibres distributed to muscles located in and around the eye.</li> <li>➤ Trochlear nerves – Type – mixed, mainly, motor Function – moves the eyeballs by sending nerve impulses to the superior oblique muscles which are among the group of muscles that rotate the eyeballs in their sockets. (the action of this nerve is coordinated with those of the oculomotor and abducens nerves) e.g. (cranial nerves III &amp; IV.)</li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen and Takes Notes</p>	Q. What are the various function of the nerve?
4.	20 min				

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>➤ Trigeminal nerves – Type – mixed Function – this is largest cranial nerve and splits into the following 3 divisions, each of which includes both motor and sensory fibres – a.) Ophthalmic nerve b.) Maxillary nerve c.) Mandibular nerve.</p> <p>The motor fibres of all 3 divisions control the facial muscles involved in chewing. the sensory fibres convey sensations of touch, pain and temperature from the front of the head including the mouth and also from the mandible.</p> <p>➤ Absucent nerves - Type – Motor Function – moves the eyeballs outwards by sending nerve impulses to the lateral rectus muscle.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Facial Nerve – Type – mixed Function – 1. sensory fibres are concerned with taste via the taste buds at the front of the tongue. 2. motor fibres control secretion of tears via the lacrimal glands and saliva via the sublingual salivary glands as well as facial expressions via some of the muscles of facial expression.</li> <li>➤ Vestibulocochlear (Auditory) nerves – Type – sensory Functions – Two branches –               <ol style="list-style-type: none"> <li>1. vestibular nerve (senses equilibrium) and cochlear nerve (hearing)</li> <li>2. Vestibular nerve – Aids equilibrium by carrying impulses from the semicircular canals ampullae, utricle and sacule.</li> <li>3. Cochlear nerve – carries impulses from the cochlea, so is known as the nerve of hearing.</li> </ol> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Glossopharyngeal nerves – Type – mixed Function – 1. Motor fibres               <ul style="list-style-type: none"> <li>➤ Modulate swallowing via supply to muscle of the throat (pharynx) area.</li> <li>➤ parasympathetic control of secretion of saliva (via supply to the parotid salivary glands)</li> </ul> </li> <li>➤ Sensory fibres –               <ol style="list-style-type: none"> <li>1. Monitors blood pressure</li> <li>2. Monitors level of oxygen and carbon dioxide in blood.</li> <li>3. Co-ordination of some muscle activity e.g. in some swallowing muscles.</li> <li>4. sensations of taste, touch, pain and temperature from posterior third of the tongue and tissue of the soft palate.</li> </ol> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Vagus nerves – Type – mixed Function – Motor fibres               <ol style="list-style-type: none"> <li>1. Under conscious control – stimulates voluntary muscles that affect. swallowing, coughing and speech.</li> <li>2. Under unconscious control</li> <li>3. Stimulates the relaxation of smooth muscle in the gastrointestinal tract.</li> <li>4. Can trigger reduction (slowing) of heart rate.</li> <li>5. Stimulates secretion of digestive fluids.</li> </ol> </li> <li>➤ Sensory fibres –               <ol style="list-style-type: none"> <li>1. monitors blood pressure</li> <li>2. monitors levels of oxygen and carbon dioxide in blood.</li> <li>3. Sensations of touch, pain and temperature.</li> <li>4. Sensations from visceral organs in thorax and abdomen.</li> </ol> </li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Accessory nerves – Type – motor Function –               <ol style="list-style-type: none"> <li>1. arises from two roots, cranial and spinal.</li> <li>2. Cranial Part – controls swallowing movement.</li> <li>3. Spinal Part - governs movement of head and shoulders by supplying the sternocleido-mustoid and trapezius muscles of neck.</li> </ol> </li> <li>➤ Hypoglossal nerves – Type – motor Function –               <ol style="list-style-type: none"> <li>1. supplier the muscles of the tongue responsible for the tongue movement in speech and swallowing.</li> </ol> </li> </ul>		

<p>Summary : &amp; Evaluation (10 min)</p> <ul style="list-style-type: none"> <li>➤ Define cranial nerve ?</li> <li>➤ Enlist the various cranial nerves.</li> <li>➤ Explain the types and function of cranial nerve.</li> </ul>
<p>Assignment :</p> <ul style="list-style-type: none"> <li>➤ List and explain the various type of cranial nerve.</li> </ul>
<p>Evaluation :</p> <ul style="list-style-type: none"> <li>➤ Unit test for 50 marks once the unit is completed.</li> </ul>
<p>Bibliography :</p> <ul style="list-style-type: none"> <li>➤</li> </ul>

## LESSON PLAN

Subject	: ANATOMY & PHYSIOLOGY
Unit	: XI The Nervous System
Topic	: Spinal Cord
Group	: I <sup>st</sup> Year GNM Students
Place	: Class-Room
Date & Time	: 60 minutes
Teaching method	: Lecture cum discussion.
AV aids / instructional aids	: Black board and chalk, .LED Projector
Student Pre requisite	: The students have an understanding about structure of nerves and brain and its functions.

General Objective : At the end of class the students will be able to gain knowledge regarding spinal cord successfully.

Specific Objectives : At the end of class the students will be able to-

- Define spinal cord.
- Describe the gross structure of the spinal cord
- Enlist the function of spinal cord.
- Explain the physiology of spinal cord

Review of previous clas : Are you remember the types of neuron structurally and functionally.

### Introduction:

This functions like a telephone system. With the brain as the head office, and nerves like the telephone wires communication takes place with all parts of the body. By means of numerous messages sent and received, the various tissues and organs of the body work in harmony.

Any one tell me what is nerves? what exactly the nerves is, now today we will discuss about .

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10Min	Define spinal cord	<p><b>Definition: The Spinal Cord</b></p> <ul style="list-style-type: none"> <li>➤ Tube of neurons that runs up the spine and attaches to the brain stem. The spinal cord is a cord of nervous tissue, the thickness of a little finger and about 45 cm long. It lies inside a canal formed by the vertebrae. It connects above with the medulla where the back of the neck joins the skull and extends to the level of the first lumbar vertebrae.</li> <li>➤ The spinal cord and spinal nerves contribute to homeostasis by providing quick, reflexive responses to many stimuli.</li> <li>➤ The spinal cord is the pathway for sensory input to the brain and motor output from the brain.</li> <li>➤ The spinal cord and spinal nerves contain neural circuits that control some of your most rapid reactions to environmental changes.</li> </ul>	T: Define spinal cord with help of black board and chalk	Q: Define spinal cord?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	10Min	Describe the gross structure of the spinal cord	<p><b>Structure and Location of the Spinal Cord-</b></p> <p>In the embryo, the spinal cord occupies the entire spinal canal and so extends down into the tail portion of the vertebral column. However, the column of bone grows much more rapidly than the nerve tissue of the cord, so that eventually the end of the cord no longer reaches the lower part of the spinal canal. This disparity in growth continues to increase; in the adult the cord ends in the region just below the area to which the last rib attaches (between the first and the second lumbar vertebrae).</p> <p>The spinal cord lies within the vertebral canal and extends from the foramen magnum to the level of the second lumbar vertebrae after which a fibrous remnant, the filum terminale, descends to be attached to the back of the coccyx. The cord is about 45 cm long. It is cylindrical in shape, flattened slightly anteroposteriorly, and has cervical and lumbar enlargements where the nerves supplying the upper and lower limb originate the enlargements lie opposite the lower cervical and lower thoracic vertebrae. Since the spinal cord is shorter than the vertebral canal, the nerves descend with increasing obliquity before leaving the canal through the intervertebral foramina. The collection of lower lumbar, sacral and</p>	T: Describe the gross structure of the spinal cwith help of black board and chalk	Q: Describe the gross structure of the spinal cord?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>coccygeal nerves below the spinal cord, with the filum erminale, is known as the cauda equina. The cord has an anterior median fissure and a posterior median sulcus. On its sides the rootlets of the spinal nerves emerge from anterolateral and posterolateral sulci.</p> <p>The spinal cord has a small, irregular shaped internal section that consists of gray matter (nerve cell bodies) and a larger area surrounding this gray part that consists of white matter (nerve cell fibers). The gray matter is so arranged that a column of cells extend up and down dorsally, one on each side; another column is found in the ventral region on each side. These two pairs of columns, called the dorsal and ventral horns, give the gray matter an H-shaped appearance in cross section. In the center of the gray matter is a small channel, central canal that contains cerebrospinal fluid, the liquid that circulates around the brain and spinal cord. The white matter consists of thousands of nerve fibres arranged in three areas external to the gray matter on each side.</p> <p><b>Grey matter</b></p> <p>The arrangement of grey matter in the spinal cord resembles the shape of the letter H, having two posterior, two anterior and two lateral columns.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>The area of grey matter lying transversely is the transverse commissure and it is pierced by the central canal, an extension from the fourth ventricle, containing cerebrospinal fluid</p> <p>The cell bodies may be:</p> <ul style="list-style-type: none"> <li>• sensory cells, which receive impulses from the periphery of the body</li> <li>• lower motor neurons, which transmit impulses to the skeletal muscles</li> <li>• connector neurons, linking sensory and motor neurons, at the same or different levels, which form spinal reflex arcs.</li> </ul> <p>At each point where nerve impulses are passed from one neuron to another there is a synaptic cleft and a neurotransmitter</p> <p><b>White matter</b></p> <p>The white matter of the spinal cord is arranged in three columns or tracts; anterior, posterior and lateral.</p> <p>These tracts are formed by sensory nerve fibers ascending to the brain, motor nerve fibres descending from the brain and fibers of connector neurons. Tracts are often named according to their points of origin and destination, e.g. spinothalamic, corticospinal.</p> <p><b>Function Of Spinal Cord-</b></p> <p>The spinal cord is the link between the</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	25Min	Enlist the function of spinal cord	<p>spinal nerves and the brain. It is also a place where simple responses, known as reflexes can be coordinated even without involving the brain. The functions of the spinal cord may be divided into three categories:</p> <ol style="list-style-type: none"> <li>1. Conduction of sensory impulses upward through ascending tracts to the brain</li> <li>2. Conduction of motor impulses from the brain down through descending tracts to the efferent neurons that supply muscles or glands</li> <li>3. Reflex activities. A reflex is a simple, rapid, and automatic response involving very few neurons. When you fling out an arm or leg to catch your balance, withdraw from a painful stimulus, or blink to avoid an object approaching your eyes, you are experiencing reflex behaviour. A reflex pathway that passes through the spinal cord alone and does not involve the brain is termed a spinal reflex. The stretch reflex, in which a muscle is stretched and responds by contracting, is one example. If you tap the tendon below the knee cap (the patellar tendon), the muscles of the anterior thigh (quadriceps femoris) contracts, eliciting the knee jerk. Such stretch reflexes may be evoked by appropriate tapping of most large muscles (such as the triceps brachii in the arm and the gastrocnemius in the calf of the leg). Because</li> </ol>	T: Enlist the function of spinal cord with help of black board and chalk	Q: Enlist the function of spinal cord?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>reflexes occur automatically, they are used in physical examinations to test the condition of the nervous system.</p> <p><b>Location and Structure of Spinal Nerves</b>            Spinal nerves arise from spinal cord. There are 31 pairs of spinal nerves, each pair numbered according to the level of the spinal cord from which it arises. Each nerve is attached to the spinal cord by two roots; the dorsal root and the ventral root. The roots are formed from a number of rootlets which emerge from the anterolateral and posterolateral sulci of the spinal cord.</p> <p><b>Functions of the Spinal Cord and Spinal Nerves</b></p> <ol style="list-style-type: none"> <li>1. The white matter of the spinal cord contains sensory and motor tracts, the “highways” for conduction of sensory nerve impulses toward the brain and motor nerve impulses from the brain toward effector tissues.</li> <li>2. The spinal cord gray matter is a site for integration (summing) of excitatory postsynaptic potentials (EPSPs) and inhibitory postsynaptic potentials (IPSPs).</li> <li>3. Spinal nerves and the nerves that branch from them connect the CNS to the sensory receptors, muscles, and glands in all parts of the body. Nerve impulses propagating into, through,</li> </ol>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>and out of the CNS follow specific pathways, depending on the kind of information, its origin, and its destination. The pathway followed by nerve impulses that produce a reflex is a <b>reflex arc (reflex circuit)</b>. A reflex arc includes the following five functional components</p> <ul style="list-style-type: none"> <li>● <b>Sensory receptor.</b> The distal end of a sensory neuron (dendrite) or an associated sensory structure serves as a sensory receptor. It responds to a specific <b>stimulus</b>—a change in the internal or external environment—by producing a graded potential called a generator (or receptor) potential. If a generator potential reaches the threshold level of depolarization, it will trigger one or more nerve impulses in the sensory neuron.</li> <li>● <b>Sensory neuron.</b> The nerve impulses propagate from the sensory receptor along the axon of the sensory neuron to the axon terminals, which are located in the gray matter of the spinal cord or brain stem.</li> <li>● <b>Integrating center.</b> One or more regions of gray matter within the CNS act as an integrating center. In the simplest type of reflex, the integrating center is a single synapse between a sensory neuron and a motor neuron. A reflex pathway having only one synapse in the CNS is</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>termed a <b>monosynaptic reflex arc</b> (<i>mono-</i> _ one). More often, the integrating center consists of one or more interneurons, which may relay impulses to other interneurons as well as to a motor neuron. A <b>polysynaptic reflex arc</b> (<i>poly-</i> _ many) involves more than two types of neurons and more than one CNS synapse.</p> <ul style="list-style-type: none"> <li>● <b>Motor neuron.</b> Impulses triggered by the integrating center propagate out of the CNS along a motor neuron to the part of the body that will respond.</li> <li>● <b>Effector.</b> The part of the body that responds to the motor nerve impulse, such as a muscle or gland, is the effector. Its action is called a reflex. If the effector is skeletal muscle, the reflex is a <b>somatic reflex</b>. If the effector is smooth muscle, cardiac muscle, or a gland, the reflex is an <b>aut.</b></li> </ul> <p><b>Spinal Cord Physiology</b></p> <ol style="list-style-type: none"> <li>1. The white matter tracts in the spinal cord are highways for nerve impulse propagation. Along these tracts, sensory input travels toward the brain, and motor output travels from the brain toward skeletal muscles and other effector tissues.</li> <li>2. Sensory input travels along two main routes in the white matter of the spinal cord: the</li> </ol>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	15Min	Explain the physiology of spinal cord	<p>posterior column and the spinothalamic tract.</p> <p><b>3.</b> Motor output travels along two main routes in the white matter of the spinal cord: direct pathways and indirect pathways.</p> <p><b>4.</b> A second major function of the spinal cord is to serve as an integrating center for spinal reflexes. This integration occurs in the gray matter.</p> <p><b>5.</b> A reflex is a fast, predictable sequence of involuntary actions, such as muscle contractions or glandular secretions, which occurs in response to certain changes in the environment.</p> <p><b>6.</b> Reflexes may be spinal or cranial and somatic or autonomic (visceral).</p> <p><b>7.</b> The components of a reflex arc are sensory receptor, sensory neuron, integrating center, motor neuron, and effector.</p> <p><b>8.</b> Somatic spinal reflexes include the stretch reflex, the tendon reflex, the flexor (withdrawal) reflex, and the crossed extensor reflex; all exhibit reciprocal innervation.</p> <p><b>9.</b> A two-neuron or monosynaptic reflex arc consists of one sensory neuron and one motor neuron. A stretch reflex, such as the patellar reflex, is an example.</p> <p><b>10.</b> The stretch reflex is ipsilateral and is important in maintaining muscle tone.</p> <p><b>11.</b> A polysynaptic reflex arc contains sensory</p>	T: Explain the physiology of spinal cord with help of projector.	Q: Explain the physiology of spinal cord?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>neurons, interneurons, and motor neurons. The tendon reflex, flexor (withdrawal) reflex, and crossed extensor reflexes are examples.</p> <p><b>12.</b> The tendon reflex is ipsilateral and prevents damage to muscles and tendons when muscle force becomes too extreme. The flexor reflex is ipsilateral and moves a limb away from the source of a painful stimulus. The crossed extensor reflex extends the limb contralateral to a painfully stimulated limb, allowing the weight of the body to shift when a supporting limb is withdrawn.</p> <p><b>13.</b> Several important somatic reflexes are used to diagnose various disorders. These include the patellar reflex, Achilles reflex, Babinski sign, and abdominal reflex.</p>		

<p><b>Summary : (5 min)</b></p> <ul style="list-style-type: none"> <li>➤ To day we learn about Spinal cord and its part, with structure and function of spinal cord . If any one have any question please tell me so we can again discuss and understand.</li> </ul>
<p><b>Assignment :</b></p> <ul style="list-style-type: none"> <li>➤ Describe the spinal cord in detail?</li> </ul>
<p><b>Evaluation :</b></p> <p>Class test once the topic (spinal cord ) is completed.</p>
<p><b>Bibliography :</b></p> <ul style="list-style-type: none"> <li>➤ Anatomy and Physiology in health and illness, Ross and Wilson.</li> <li>➤ Principles of Anatomy and Physiology, Tortora and Derrickson,.</li> </ul>

## LESSON PLAN

Subject : Bio – Science

Unit : Nervous system.

Topic : Pathway of spinal cord

Group : GNM First Year.

Place : Class – Room.

Date & Time : 60 minutes

Teaching method : Lecture Cum Demonstration

AV aids / instructional aids : Black board and Chalk, PPT., Diagram.

Student Pre requisite : The students should be able to gain knowledge about Pathway of spinal cord.

General Objective : At the end of the class the students will be able to gain knowledge about Pathway of spinal cord.

Specific Objectives : At the end of the class the students will be able to –

- To explain the difference between sensory nerve tracts & Motor nerve tracts.
- To explain the Pathway of spinal cord.

Review of previous class : Ask the questions regarding nervous system.

### Introduction:

- Ask the students about Spinal cord.
- Ask the students about spinal nerves.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	20 min	To explain Pathway of spinal cord.(Sensory nerve tracts.)	<p>Pathway of Spinal Cord –</p> <ul style="list-style-type: none"> <li>➤ Pathway of spinal cord is classified into two tracts –               <ol style="list-style-type: none"> <li>1. Sensory nerve tract</li> <li>2. Motor nerve tract.</li> </ol> </li> </ul> <p>Sensory Nerve tract in the spinal cord–</p> <ul style="list-style-type: none"> <li>➤ Definition – Axons of Neurones that transmit impulses towards the brain are called sensory nerves (ascending tract)</li> <li>➤ Spinal cord promotes homeostasis by conducting nerve impulses along tracts.</li> <li>➤ Name of a tract indicates its position in the white matter and where it begins and ends. for eg.- a.) Anterior spinothalamic tract is located in the anterior white column, It begins in the spinal cord and ends in the thalamus.               <ol style="list-style-type: none"> <li>b.) The lateral and anterior spinothalamic tracts convey nerve impulses for sensing pain, heat, cold, itching, tickling deep pressure, touch.</li> <li>c.) Right and Left posterior columns carry nerves impulses for several kind sensations.</li> </ol> </li> </ul>	Explain student listen & take notes and make diagram.	Ask question



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ These includes –               <ol style="list-style-type: none"> <li>1. Proprioception , awareness of the positions and movement of muscles, tendons and joints.</li> <li>2. Discriminative touch, the ability to feel exactly what part of the body is touched.</li> <li>3. Two point discrimination, The ability to distinguish the touching of 2 different points on the skin.</li> <li>4. Vibration sensations.</li> </ol> </li> <li>➤ The nerve impulses generated are conducted by three neurones to sensory area in the opposite hemisphere of the cerebrum where the sensation and its location are perceived. Crossing to the other side, or decussation occurs either at the level of entry into the cord or in the medulla.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	30 min	To explain Pathway of spinal cord.(Motor nerve tracts.)	<p>Motor nerve tracts –</p> <ul style="list-style-type: none"> <li>➤ Definition – axons of Neurones that transmit impulses away from the brain are called motor nerves (descending tract.)</li> <li>➤ Stimulation of the motor neurones result in –               <ol style="list-style-type: none"> <li>1. contraction of skeletal (voluntary )muscles</li> <li>2. Contraction of smooth.(involuntary) muscles, cardiac muscle, and the secretion by glands controlled by nerves of the autonomic nervous system.</li> </ol> </li> </ul> <p>Contraction of skeletal (voluntary )muscles –</p> <ul style="list-style-type: none"> <li>➤ The contraction of the muscles that move the joints is , in the main, under conscious (Voluntary) control , which means that the stimulus to contract originates at the level of consciousness in the cerebrum.</li> <li>➤ Motor output to skeletal muscles travels down the spinal cord in two types of descending pathway: direct and indirect.</li> </ul>	T: Explain student listen & take notes,Chart.	Ask question

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ The direct pathway include the lateral corticospinal, anterior corticospinal, and corticobulbar tracts. They convey nerve impulses that originate in the cerebral cortex and are destined to cause precise, voluntary movements of skeletal muscles.</li> <li>➤ Indirect pathways include the rubrospinal, tectospinal, and vestibulospinal tracts. they convey nerve impulses from the brain stem and other parts of the brain that govern automatic movements and help coordinate body movements with visual stimuli. Indirect pathways also maintain contraction of postural muscles, and play a major role in equilibrium by regulation muscles tone in response to movements of the head.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Contraction of Smooth muscles – (Involuntary muscles movements)</p> <ul style="list-style-type: none"> <li>➤ Upper motor neurones have their cell bodies in the brain at the level below the cerebrum e.g. – in the mid brain, brain stem, cerebellum or spinal cord.</li> <li>➤ They influence muscles activity that maintain posture and balance, coordinate skeletal muscles movement and control muscle tone.</li> </ul>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ Define neurones.</li> <li>➤ Describe the pathway of spinal cord.</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Briefly Describe about the pathway of spinal cord.</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Take the unit test, after the completion of the unit.</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ A Text book of Biological Science – S.S. Randhana.</li> <li>➤ A text book of Ross &amp; Wilson – Anatomy &amp; Physiology.</li> </ul>

## Lesson plan

**Subject** – Bioscience

**Unit** - 11 (The Nervous System)

**Topic** - Pathway of motor nerve

**Group** - G.N.M. 1<sup>st</sup> year

**Place** - Classroom

**Date & time** – 60 minutes

**Teaching method** – lecture cum discussion

**A. V. Aids** – Black board & chalk, L.C.D. projector & computer

**Students prerequisite:-** the students should be able to understand nerve especially motor nerve and its pathway and would be able to recognize the importance of motor nerve in human nervous system.

**General objective:-** at the end of the class the students will be able to gain knowledge regarding motor nerve & the pathway of motor nerve.

**Specific objectives:-** At the end of the class the students will be able to:-

- Define motor nerve.
- Classify the pathway of motor nerve.
- Describe direct/pyramidal pathway.
- Explain indirect/extrapyrmidal pathway.

**Review of previous class:-** Ask questions regarding nervous system, its parts, functions neurones and nerve.

**Introduction:-**

Ask the students if they have any knowledge regarding neurones, nerve & its types.

What should occur if your leg is stuck with a pin? What response will your body show on that circumstance?

Also mention the objectives of the lesson to the students here.

S.No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1	5 min.	Define motor nerve.	<b><u>Motor neurones</u></b> Neurones that transmit nerve impulses away from the brain are motor (efferent or descending) neurones. Stimulation of the motor neurones results in:- <ul style="list-style-type: none"> <li>• Contraction of skeletal (voluntary) muscle</li> <li>• Contraction of smooth (involuntary) muscle, cardiac muscle &amp; the secretion by glands controlled by nerves of ANS.</li> </ul>	T: explains with black board & chalk S: listens & discuss.	Define motor nerve.
2	5 min.	Classify the pathway of motor nerve.	Motor output to skeletal muscles travels down the spinal cord in two types of descending pathways:- <ol style="list-style-type: none"> <li>1. Direct/pyramidal pathway</li> <li>2. Indirect/extrapyramidal pathway</li> </ol>	T: explains with black board & chalk S: listens & discuss.	What are the various pathway of motor nerve?
3	15 min.	Describe direct/pyramidal pathway	Direct pathway:- It includes:- <ul style="list-style-type: none"> <li>• Lateral corticospinal</li> <li>• Anterior corticospinal</li> <li>• Corticobulbar tract</li> </ul>	T: explains with ppt S: listens & write down notes	Describe direct pathway.
4	15 min.	Explain indirect/extrapyramidal pathway	Indirect pathway:- It includes:- <ul style="list-style-type: none"> <li>• Rubrospinal tract</li> <li>• Reticulospinal tract</li> <li>• Tectospinal tract</li> <li>• Vestibulospinal tract</li> </ul>	T: explains with ppt S: listens & write down notes	Explain indirect pathway.

S.No.	Time	Specific objective	Content	Teaching learning activity	Evaluation																				
			<p><b><u>Extrapyramidal upper motor neurones:-origins &amp; tracts</u></b></p> <table><tr><th>Origin</th><th>Name of tract</th><th>Site in spinal cord</th><th>Functions</th></tr><tr><td>Midbrain &amp; pons</td><td>Rubrospinal tract decussates in brain stem</td><td>Lateral column</td><td>Control of skilled muscle movement</td></tr><tr><td>Reticular formation</td><td>Reticulospinal tract does not decussate</td><td>Lateral column</td><td>Coordination of muscle movement, maintenance of posture &amp; balance</td></tr><tr><td>Midbrain &amp; pons</td><td>Tectospinal tract decussates in midbrain</td><td>Anterior column</td><td>Coordination of muscle movement, maintenance of posture &amp; balance</td></tr><tr><td>Midbrain &amp; pons</td><td>Vestibulospinal tract, some fibres decussate in the cord.</td><td>Anterior column</td><td>Coordination of muscle movement, maintenance of posture &amp; balance</td></tr></table>	Origin	Name of tract	Site in spinal cord	Functions	Midbrain & pons	Rubrospinal tract decussates in brain stem	Lateral column	Control of skilled muscle movement	Reticular formation	Reticulospinal tract does not decussate	Lateral column	Coordination of muscle movement, maintenance of posture & balance	Midbrain & pons	Tectospinal tract decussates in midbrain	Anterior column	Coordination of muscle movement, maintenance of posture & balance	Midbrain & pons	Vestibulospinal tract, some fibres decussate in the cord.	Anterior column	Coordination of muscle movement, maintenance of posture & balance		
Origin	Name of tract	Site in spinal cord	Functions																						
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<p>Summary &amp; evaluation (10 min.)</p> <ul style="list-style-type: none"> <li>• Define motor neurone</li> <li>• What are the various pathway of motor nerve</li> <li>• Explain about direct pathway.</li> </ul>
<p>Assignment:- Explain the various pyramidal &amp; extrapyramidal pathways of motor nerve.</p>
<p>Evaluation:- Unit test for 50 marks once the unit 11 is completed</p>
<p>Bibliography :-</p> <ul style="list-style-type: none"> <li>• A textbook of Biological Science (anatomy &amp; physiology), S.S. Randhawa pg. no. 518-519</li> <li>• Ross &amp; Wilson Anatomy &amp; Physiology in health &amp; illness, Anne Waugh, Allison Grant pg. no. 163-164</li> <li>• Gray's anatomy for students, Richard L. Drake, A. Wayne Vogl, Adam W.M.Mitchell pg.no. 34</li> </ul>

## Lesson plan

**Subject** – Bioscience

**Unit** - 11 (The Nervous System)

**Topic** - Pathway of sensory nerve

**Group** - G.N.M. 1<sup>st</sup> year

**Place** - Classroom

**Date & time** – 60 minutes

**Teaching method** – lecture cum discussion

**A. V. Aids** – Black board & chalk, L.C.D. projector & computer

**Students prerequisite:-**The students should be able to understand neurones especially sensory neurones and its pathway and would be able to recognize the importance of sensory neurones in human nervous system.

**General objective:-**At the end of the class the students will be able to gain knowledge regarding sensory nerve & the pathway of sensory nerve.

**Specific objectives:-** At the end of the class the students will be able to:-

- Define sensory nerve.
- Enumerate sources of sensation transmission.
- Describe origins, routes and destinations of sensory nerve impulses.

**Review of previous class:-** Ask questions regarding nervous system, its parts, functions neurones and nerve, motor nerve and its pathway.

**Introduction:-**

Ask the students if they have any knowledge regarding neurones, nerve, its types.

What should occur if your leg is stuck with a pin? What response will your body show on that circumstance?

What is sensory as well as motor nerve?

Also mention the objectives of the lesson to the students here.

S.no.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1	10 min.	Define sensory neurones	<p><b><u>Sensory neurones</u></b> Neurones that transmit impulses towards the brain are called sensory (afferent, ascending) neurones.</p>	T: explains with black board & chalk S: listens & discuss.	Define sensory neurone.
2	15 min.	Enumerate sources of sensation transmission	<p><b>Sources of sensation transmission</b> There are two main sources of sensation transmitted to the brain via spinal cord:-</p> <ol style="list-style-type: none"> <li>1. The skin</li> <li>2. The tendons, muscles &amp; joints</li> </ol> <p><b>The skin:-</b> Sensory receptors (nerve endings) in the skin are stimulated by pain, heat, cold &amp; touch including pressure. The nerve impulses generated are conducted by three neurones to the sensory area in the opposite hemisphere of the cerebrum where the sensation &amp; its location are perceived. Crossing to the other side or decussation occurs either at the level of entry into the cord or in the medulla.</p> <p><b>The tendons, muscles &amp; joints:-</b> Sensory receptors are specialised nerve endings in these structures called proprioceptors &amp; they are stimulated by stretch. Together with impulses from the eyes &amp; the ears, they are associated with the maintenance of balance &amp; posture &amp; with perception of the position of the body in space. These nerve impulses have two destinations:-</p> <ul style="list-style-type: none"> <li>• By a three-neurone system, the impulses reach the sensory area of the opposite hemisphere of the</li> </ul>	T: explains with black board & chalk S: listens & discuss.	What are the sources of sensation transmission?

S.no.	Time	Specific objective	Content	Teaching learning activity	Evaluation												
3	20 min.	Describe origins, routes and destinations of sensory nerve impulses.	<p>cerebrum.</p> <ul style="list-style-type: none"><li>By a two-neurone system, the nerve impulses reach the cerebellar hemisphere on the same side.</li></ul> <p><u>Sensory nerve impulses: origins, routes, destinations</u></p> <table><tr><th>Receptor</th><th>Route</th><th>Destination</th></tr><tr><td>Pain, touch, temperature</td><td>Neurone 1:- To spinal cord by posterior root Neurone 2:- Decussation on entering spinal cord then in anterolateral spinothalamic tract to thalamus Neurone 3:-</td><td>To parietal lobe of cerebrum</td></tr><tr><td>Touch, proprioceptors</td><td>Neurone 1:- To medulla in posterior spinothalamic tract Neurone 2:- Decussation in medulla, transmission to thalamus Neurone 3:-</td><td>To parietal lobe of cerebrum</td></tr><tr><td>Proprioceptors</td><td>Neurone 1:- To spinal cord Neurone 2:-</td><td>No decussation, to cerebellum in posterior spinocerebellar tract</td></tr></table>	Receptor	Route	Destination	Pain, touch, temperature	Neurone 1:- To spinal cord by posterior root Neurone 2:- Decussation on entering spinal cord then in anterolateral spinothalamic tract to thalamus Neurone 3:-	To parietal lobe of cerebrum	Touch, proprioceptors	Neurone 1:- To medulla in posterior spinothalamic tract Neurone 2:- Decussation in medulla, transmission to thalamus Neurone 3:-	To parietal lobe of cerebrum	Proprioceptors	Neurone 1:- To spinal cord Neurone 2:-	No decussation, to cerebellum in posterior spinocerebellar tract	T: explains with ppt. S: listens & discuss.	Explain the origin, route and destination of sensory nerve impulses.
Receptor	Route	Destination															
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Proprioceptors	Neurone 1:- To spinal cord Neurone 2:-	No decussation, to cerebellum in posterior spinocerebellar tract															

Summary & evaluation (10 min.)
<ul style="list-style-type: none"> <li>• Define sensory neurone</li> <li>• What are the various pathway of sensory nerve</li> <li>• Explain about origins, routes &amp; destinations of sensory nerve impulses.</li> </ul>
Assignment:- Explain the pathway of sensory nerve.
Evaluation:- Unit test for 50 marks once the unit 11 is completed
Bibliography :- <ul style="list-style-type: none"> <li>• A textbook of Biological Science (anatomy &amp; physiology), S.S. Randhawa pg. no. 518-519</li> <li>• Ross &amp; Wilson Anatomy &amp; Physiology in health &amp; illness, Anne Waugh, Allison Grant pg. no. 162-163</li> <li>• Gray's anatomy for students, Richard L. Drake, A. Wayne Vogl, Adam W.M. Mitchell pg.no. 954-968</li> </ul>

## Lesson plan

**Subject** – Bioscience

**Unit** - 11 (The Nervous System)

**Topic** - Autonomic nervous system

**Group** - G.N.M. 1<sup>st</sup> year

**Place** - Classroom

**Date & time** – 60 minutes

**Teaching method** – lecture cum discussion

**A. V. Aids** – Black board & chalk, L.C.D. projector & computer

**Students prerequisite:-** the students should be able to understand ANS and would be able to recognize the importance of Sympathetic & parasympathetic nervous system.

**General objective:-** at the end of the class the students will be able to gain knowledge regarding ANS.

**Specific objectives:-** At the end of the class the students will be able to:-

- Define ANS.
- Enlist the divisions of ANS.
- Explain functions of ANS
- 

**Review of previous class:-** Ask questions regarding nervous system, its parts, functions of neurones and nerve.

**Introduction:-**

Ask the students if they have any knowledge regarding nervous system.

What would occur if a person's nervous system does not function properly?

Also mention the objectives of the lesson to the students here.

S.No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1	10 min.	Defines ANS.	<p><b>Autonomic nervous system</b> The autonomic or involuntary part of the nervous system controls involuntary body functions.</p>		What is autonomic nervous system?
2	10 min	Enlist divisions of ANS.	<p><b>Divisions:-</b> The ANS is separated into two divisions:-            1. Sympathetic (thoracolumbar outflow)            2. Parasympathetic (craniosacral outflow)            The two divisions work in an integrated &amp; complementary manner to maintain involuntary functions &amp; homeostasis.            Such activities include:-</p> <ul style="list-style-type: none"> <li>• Coordination &amp; control of breathing</li> <li>• Blood pressure</li> <li>• Water balance</li> <li>• Digestion &amp; metabolic rate</li> </ul> <p>Sympathetic activity predominates in stressful situations as it equips the body to respond when exertion &amp; exercise is required.            Parasympathetic activity is increased when digestion &amp; restorative body activities predominate.            Each division has two efferent neurons between the CNS &amp; the effector organs. These are:-            1. Preganglionic neurone            2. Postganglionic neurone            The cell body of preganglionic neurone is in the brain or spinal cord. Its axon terminals in an autonomic ganglion outside the CNS.</p>	T:explains with the help of black board & chalk S:listens & discuss	What are the two divisions of ANS?

S.No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
3	25 min.	Explain functions of ANS	<p><b>Functions of ANS:-</b></p> <p><u>Sympathetic division:-</u></p> <ol style="list-style-type: none"> <li>1. Increase heart rate</li> <li>2. Dilates coronary arteries, increasing blood supply to cardiac muscle</li> <li>3. Smooth muscle relaxation of respiratory tract resulting bronchodilation</li> <li>4. Increase in metabolic rate</li> <li>5. Smooth muscle contraction (peristalsis) &amp; secretion of digestive juices are inhibited, delaying digestion.</li> <li>6. Muscle tone of urethral &amp; anal sphincters is increased, inhibiting micturition &amp; defecation.</li> <li>7. Dilation of pupil of eye.</li> <li>8. Increases sweat secretion.</li> </ol> <p><u>Parasympathetic division:-</u></p> <ol style="list-style-type: none"> <li>1. Decrease rate &amp; force of heart beat.</li> <li>2. Constrict coronary arteries, reducing blood supply to cardiac muscle.</li> <li>3. Bronchoconstriction</li> <li>4. Increased bile secretion</li> <li>5. Stomach &amp; small intestine motility &amp; secretion are increased, together with the rate of digestion &amp; absorption of food</li> <li>6. Increase pancreatic juice secretion</li> <li>7. Relaxation of internal urethral &amp; anal sphincter</li> <li>8. Constriction of pupil of eye.</li> </ol>	T:explain with the help of ppt. S:listens carefully & write down notes	Explain any two functions of sympathetic & parasympathetic division.



Summary & evaluation (10 min.)

- Define ANS.
- What are the various divisions of ANS
- Explain about functions of ANS..

Assignment:- Explain the various functions of sympathetic & parasympathetic nervous system.

Evaluation:- Unit test for 50 marks once the unit 11 is completed

Bibliography :-

- A textbook of Biological Science (anatomy & physiology), S.S. Randhawa pg. no. 522-527
- Ross & Wilson Anatomy & Physiology in health & illness, Anne Waugh, Allison Grant pg. no. 173-177
- Gray's anatomy for students, Richard L. Drake, A. Wayne Vogl, Adam W.M.Mitchell pg.no. 38-45

## LESSION PLAN

Subject: - BIO –SCIENCE (ANATOMY AND PHYSIOLOGY)

Unit: - XII -THE SENSE ORGANS

TOPIC: - SKIN (299)

GROUP: -G.N.M.FISRT YEAR

PLACE: - Class room

Date & Time:-

Duration:- ONE HOUR

Teaching Method:-Lecture cum Discussion

AV Aids:- Black Board and chalk and Projector

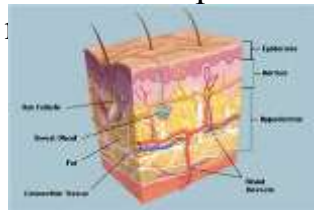
Students Pre requisite : - The students have little knowledge about human ANATOMY OF SKIN.

General Objective: -At the end of the unit, the students will be able to explain the ANATOMY OF SKIN

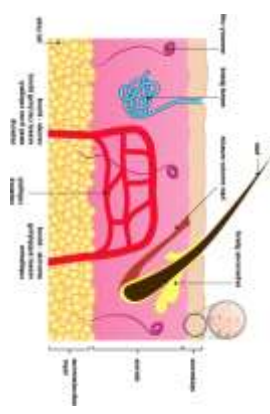
Specific Objective: - At the end of the class students will be able to

- Describe structure of the skin.
- Explain the principal function of the skin.
- Describe accessory structure of skin.

Review of Previous Class	Ask Question regarding ANATOMY OF SKIN its structure and functions of skin. its importance in nursing
Introduction	The skin covers and protects the surface of the body and is continuous with the mucous membrane lining the cavities and orifices which open on to the surface. The skin has many functions; it contains the tactile nerve endings, helps to regulate the temperature and to control the loss of water from the body, and possesses some excretory, secretory and absorptive properties.

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1	20 min.	Describe structure of the skin	<p>Diagram of skin showing structure</p> <p>The skin is divided into two layers:</p> <p>The Epidermis or cuticle, and The Dermis or corium.</p> <p><b>Epidermal Layers.</b> The Horny zone lies superficial. It is made up the three upper layers of the cells of which the epidermis is composed.</p> <p>Stratum corneum. Thin ,flat scales 0- like cells which are constant being cast off.</p> <p>Stratum lucidum. Cells with and indistinct outline but no nuclei.</p> <p>Stratum granulosum. A layer of well defined cells containing nuclei and also granules - hence the term granulosum.</p> <p>The Germinal zone lies beneath the horny zone and consists of two layers of well- formed epithelial cells:</p> <p>Prickle cells, which are so – named because minute fibrils which connect one cell with another in this layer give individual cells the appearance of having prickles.</p> <p><b>Basal cells.</b> These are the cells from which new epidermal cells are constantly being produced. These cells are constantly</p>	<p>T.-Describe structure of skin with the help of Black Board/</p> <p>S- ListenParticipateand</p> 	Q.- Describe structure of skin with labelling it.

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p>being produced. These cells are arranged in an orderly fashion; they are packed closely together and form the first layer or two of cells which rest on the papillae of the dermis.</p> <p><b>Cornium or Dermis</b> is made up of fibrous and elastic connective tissue. The surface of the dermis is arranged in small papillae which contain loops of capillary blood vessels. The nerve endings of the sensory nerves, the tactile bodies, lie in the dermis. The coiled tubes of numerous sweat glands lie in the deep parts of the dermis, and the ducts from these pass through dermis and epidermis as spiral canals, to open on to the surface of the skin at minute depressions called pores. Some specially altered sweat glands are the ceruminous glands in the skin of the ear.</p> <p><b><u>Sebaceous glands .</u></b> These are small saccular glands found in the skin, they are flask – shaped and open into a hair follicles. These glands are most numerous in the scalp and face, around the nose, and ear, and do not occur at all in the skin or the palm of the hands and the soles of the feet. Both gland and duct are lined by epithelial cells. Changes in these cells result in the fatty secretion which is called sebum.</p> <p><b><u>Appendages of the Skin.</u></b> The hairs and nails and sebaceous glands are looked upon as appendages of the skin. Hairs and nails are modified epidermal cells. The hair grows from a hair follicle which is a deep recess in the epidermis..<u>The hairs and nails and sebaceous glands are looked upon as appendages of the skin. Hairs and nails are modified epidermal cells. The hair grows from a hair follicle which is a deep recess in the epidermis.</u></p>		

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
2	15 min.	Appendages (Accessories) of the Skin.	<p><b>The hair follicle</b> is lined with epidermal cells and at the bottom of it is papilla from which the hair grows. In health when a hair drops out it is replaced by another hair grown from the same papilla. The root of the hair lies in the follicle. At its deepest extremity the hair is slightly thickened to form the hair bulb. This part fits over a vascular papilla and it is from soft cells in this region that the hair grows. The part which projects from the surface is the hair – shaft. The colour of the hair is due to the amount of pigment in the epidermis. Associated with the hair follicles are minutes involuntary muscles, the arrectores pilorum or ‘the raisers of the hairs’, also sebaceous glands which secrete a fatty substances called sebum, which keeps the skin soft and smooth, and the hair glossy.</p> <p><b>Nails.</b> The nail is composed of modified skin. It lies on a nail bed in which the dermis is arranged in ridges instead of in papillae as in the skin. The nail bed is well supplied with nerves and is very vascular. The proximal part of the nail lies in a groove of the skin, the nail groove –it is thinnest in this region; and the white part, called the lunula, because of its shape, is the portion from which the nail grows forward. The body of the nail is the uncovered part, it is firmly attached to the nail bed. The distal extremities of the nail free – the free border – and at each side the nail is bounded by a fold of skin termed the nail wall.</p> <p><b>The Skin as a Heat – regulating Organ</b> The temperature of body in man is constant. It is maintained</p>	<p>T.- Describe Appendages (Accessories) of the Skin. with the help of Black Board/ S- ListenParticipateand note.</p> 	Q.- Describe Appendages (Accessories) of the Skin with labelling it.

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
3	15 min.	<p>THE FUNCTIONS OF THE SKIN</p> <p>The Skin as a Heat – regulating Organ</p>	<p>by an adjustment between heat loss and heat production, which is controlled by the heat – regulation centre. This becomes aware of any changes in the body temperature, by the temperature of the blood passing through the medulla. The vaso-motor nerves control the state of the cutaneous arterioles by two actions, vaso-dilatation and vaso-constriction. In vaso-dilatation the arterioles are dilated, the skin gets hotter, and excess of heat is rapidly got rid of by radiation, by the evaporation of moisture from and surface of the body. In vaso- constriction the skin vessels are constricted, the skin becomes pale and cold, sweating is almost stopped and the loss of heat is checked. By this control heat loss is increased or decreased according to the needs of the body.</p> <p>The skin is the principal organ concerned in the loss of heat from the body. A considerable amount of heat is also lost by the lungs, and a little by the faeces and urine.</p> <p>It is by means of the evaporation of sweat on the skin surface that this organ acts as a controller of the body temperature.</p> <p>Heat is lost by the skin in various ways:</p> <p>(i)By <i>evaporation</i>, the amount of sweat formed depends on the amount of blood passing through the skin vessels,</p> <p>(ii)By <i>radiation</i>, heat is given off to the surrounding air,</p> <p>(iii)By <i>conduction</i>, heat is transmitted to objects in contact, such as clothing, and</p> <p>(iv)By <i>convection</i>, by movement of heated air in currents , the air in contact with surface of the body is replaced by cooler air.</p> <p><b>The Skin as an Organ of Special Sense.</b></p> <p>The sensation of touch resulting from the stimulation of the nerve endings in the skin varies with type of nerve ending</p>	<p>T.- Describe the functions of the skin with the help of Black Board/</p> <p>S- ListenParticipateand note.</p>	<p>Q.- Describe the functions of the skin with labelling it.</p>

		<p>stimulated. The sensations of heat, cold, and pain are all separate sensations. Certain spots exist in the skin called sensory spots; some of these are sensitive to cold, some to heat, and others to pain.</p> <p>The sensations produced by deep pressure, and the sensation enabling to person to determine and judge the weight of an article, arise in the deeper structures such as the muscles and joints.</p> <p><b>Some of the Protective Properties of the Skin.</b></p> <p>The skin is relatively waterproof to the extent that it prevents loss of fluid from the tissues and it also prevents the passage of water in these tissues when, for example, the body is immersed in water. The epidermis prevents injury to the underlying structures and, covering as it does the sensory nerve endings in the dermis, it mitigates pain. When the epidermis is destroyed as in burns of the third degree, this protection being removed, every contact becomes painful, and exudation of fluid from the now exposed dermis causes serious loss of the body fluid with the result that the patient is in danger of dehydration and shock.</p> <p>The skin is so closely connected with the psychic mechanism of the individual that it acts as mirror of the emotions: blushing with pleasure or shame, pallor and clamminess in fear, It is involved in a number of general infective conditions accompanied by rashes.</p> <p>Skin diseases or disorders may be due to infective micro-organisms as in impetigo; to viruses as in herpes; to fungi as in ringworm and athlete's foot; to animal parasites in scabies and pediculosis.</p> <p>Many forms of dermatitis of eczema (inflammation of the skin )are due to an allergy to some food, drug, or chemicals used externally or handled, such as powders,</p>		
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	.		<p>petrol, detergents and so on. Most of these are accompanied by erythema (redness) and urticaria (raised weals), conditions which often cause severe itching. Of other skin conditions such as <i>psoriasis</i> little is known of the cause. But all skin conditions are distressing , irritable, and require frequent attention for care and cure (when possible).</p> <p>There are also malignant conditions – for example, <i>rodent ulcer</i> and malignant <i>melanoma</i>.</p> <p>The skin protects the body with the mucous membrane lining the cavities and orifices which open on to the surface. Skin has many functions; it, helps to regulate the temperature and to control the loss of water from the body, and possesses some excretory, secretory and absorptive properties.</p>		



	10 Min.	Summary			
		Assignment	DESCRIBE STURUCTURE OF SKIN AND ITS FUNCTIONS.		
		Evaluation	<ul style="list-style-type: none"> <li>- Easy Type Question</li> <li>- Short type question</li> </ul>		
		Bibliography	1.PR Ashalata and G Deepa (text book of anatomy and physiology for nurses) jaypee publication 2.S.S.RANDHAWA biological science (pee vee books)		

## LESSON PLAN

Subject	: Bio- Science
Unit	: 12 - Sense organ
Topic	: 300 - Ear & Eye.
Group	: GNM First Year.
Place	:Class – Room
Date & Time	: 60 minutes
Teaching method	: Lecture Cum Demonstration.
AV aids / instructional aids	: Chalk – Board, Chart.
Student Pre requisite	: Students have little knowledge about sense organs.
General Objective	: At the end of the lesson students will be able to understand structure and functions of the eye and ear.

Specific Objectives : After completing the lesson students will be able to

- Describe position and structure of the eye.
- Explain eye muscles, nerve supply of eye muscles and blood supply.
- Describe the structure of the ear.
- Define the actions of the ear.

Review of previous class : Ask the student about knowledge regarding ear & eye and other sense organs.

### Introduction:

- Good all of you remember about the sense organ. Now today we are going to discuss the structure & function of the ear & eye.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	20 min	Describe position and structure of the eye.	<ul style="list-style-type: none"> <li>➤ The human eye is a elongated ball about 1 inch or 2.5 cm in diameter and is protected by a bony socket in the skull and nerve supplied by optic nerve or II cranial nerve.</li> <li>➤ The eye has three layers of coat that make up the sclera, choroid and retina.</li> </ul> <p>Sclera –</p> <ul style="list-style-type: none"> <li>➤ The outer layers of the eye is the sclera which is tough while fibrous layer that maintains protects and supports the shape of the eye.</li> <li>➤ The front of the sclera is transparent and is called the cornea.</li> <li>➤ The cornea refracts light rays and acts like the outer window of the eye.</li> </ul> <p>Choroid –</p> <ul style="list-style-type: none"> <li>➤ The middle thin layer of the eye is the choroid also known as choroid coat it is the vascular layer of the eye tying between the retina and the sclera. The choroid provides oxygen and nourishment to the outer layers of the retina.</li> </ul>	<p>T:Lecture cum Demonstration.</p> <p>S: Listen and take notes.</p>	Explain structure of the eye?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Light enters the front of the eye through a hole in the choroid coat called the pupil.</li> <li>➤ The iris contracts and dilates to compensate for the changes in light intensity.</li> <li>➤ If the light is bright the iris then contract making the pupil smaller iris dilates making the pupil bigger.</li> <li>➤ Just posterior to the iris is the lens which is composed mainly of protein called crystalline.</li> <li>➤ The lens is attached and supported by ciliary muscles that control the shape of the lens for</li> </ul> <p>Retina –</p> <ul style="list-style-type: none"> <li>➤ The third or inner most layer of the eye is call the retina in adults the entire retina is 72% of a sphere about 22 mm in diameter.</li> <li>➤ Posterior compartment located between lens and retina is called vitreous chamber which is filled with a clear, gelatinous material known as vitreous humour.</li> <li>➤ Within the retina there are cells called rod cells and cone cells also known photoreceptors.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	13 min	Explain eye muscles nerve supply of eye muscles and blood supply	<ul style="list-style-type: none"> <li>➤ The rod cells are very sensitive to light and do not see colour, that is why when we are in a darkened room we see only shades of gray.</li> <li>➤ The cone cells are sensitive different wave length of light.</li> <li>➤ At the centre of the retina is the optic disc sometimes known as the blind spot.</li> </ul> <p>Eye muscles – Six type of skeletal muscles –</p> <ol style="list-style-type: none"> <li>1.) media rectus muscles</li> <li>2.) Lateral rectus muscles</li> <li>3.) superior rectus muscles</li> <li>4.) Inferior rectus muscles</li> <li>5.) Superior oblique muscles</li> <li>6.) Inferior oblique muscles</li> </ol> <p>Nerve supply of eye muscles –</p> <ol style="list-style-type: none"> <li>a.) Oculomotor, III cranial nerve</li> <li>b.) Trochlear, IV cranial nerve</li> <li>c.) Abdu cent, VI cranial nerve</li> </ol> <p>Blood supply –</p> <p>It is by the ciliary artery and central retina artery these are branches of ophthalmic artery and this a branch of internal carotid artery.</p> <ul style="list-style-type: none"> <li>➤ Venous drainage by the central retina vein which sinus.</li> </ul>	Lecture cum discussion with the help of chart.	Describe is eye muscles, nerve supply and blood supply of eye?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	15 min	Structure of Ear.	<p>Ear canal – Slightly S-Shaped and 2.5cm long. which separate the auricle and tympanic membrane.</p> <ul style="list-style-type: none"> <li>➤ Tympanic membrane – (eardrum) It is oval shaped and composed of 3 types of tissues –               <ol style="list-style-type: none"> <li>1. outer covering of hair less skin, middle layer of fibrous tissue and inner lining of mucus membrane which continuous with middle ear.</li> </ol> </li> </ul> <p>Middle ear or tympanic cavity –</p> <ul style="list-style-type: none"> <li>➤ Air filled cavity behind the ear drum which is situated in the petrous portion of the temporal bone.</li> <li>➤ The middle ear includes most of the ear drum and the 3 ear bones ossicles – malleus (hammer shaped) incus (anvil shaped), stapes (stirrup shaped)</li> <li>➤ The ear is the sense organ that collects and detects sound waves and plays a major role in sense of balance and body position. It is also called stat acoustic organ or photoreceptor and nerve supplied by XIII cranial nerve.</li> </ul>	Lecture cum discussion with the help of chart.	What is ear and explain structure of the ear?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ The ear is divided into 3 parts               <ol style="list-style-type: none"> <li>1. External ear</li> <li>2. Middle ear (tympanic cavity)</li> <li>3. Internal ear</li> </ol> </li> <li>External ear –               <ul style="list-style-type: none"> <li>➤ Auricle or pinna – out portion composed of fibro elastic cartilage and covered by skin. Its outer part is helix and lower part is called lobule which is soft and made of adipose tissue.</li> <li>➤ The opening of the Eustachian tube is also within in the middle ear.</li> <li>➤ The stapes is the smallest bone in the human body.</li> <li>➤ The incus is the bridge between the malleus and stapes.</li> </ul> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Inner ear – (cochlea, vestibule, and semi-circular canals)</p> <ul style="list-style-type: none"> <li>➤ The inner ear includes both the organ of hearing (the cochlea) and a sense organ (the labyrinth or vestibular apparatus).</li> <li>➤ The balance portion of the inner ear consist of 3 semi circular canals and the vestibule.</li> <li>➤ Within the cochlea are three fluid filled spaces – tympanic canal, vestibular canal, and the middle canal.</li> <li>➤ cochlear canal divide bony labyrinth into chamber.               <ol style="list-style-type: none"> <li>1. Scala vestibule – upper chamber and filled with perilymph.</li> <li>2. Scala tympani – lower chamber and filled with perilymph.</li> <li>3. Sclala media – Middle canal and filled with endolymph..</li> </ol> </li> <li>➤ Organ of corti – found on basilar membrane of the scala vestibule. The hair cells in the organ of corti are stimulated by particular frequencies of sound, based on their location with in the cochlea.</li> <li>➤ Human are able to hear sound between about 20 Hz and 20000 Hz.</li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	2 min	Outline the action of the ear	Functions – <ul style="list-style-type: none"> <li>➤ Balancing or equilibrium.</li> <li>➤ Hearing.</li> </ul>	Lecture cum discussion	What are the functions of ear?

Summary : & Evaluation (10 min)
<ul style="list-style-type: none"> <li>➤ Today we have discussed about position and structure of the eye &amp; ear and its related aspect.</li> <li>➤ Ask various questions about structure and functions of Eye &amp; Ear.</li> </ul>
Assignment :
<ul style="list-style-type: none"> <li>➤ Structure of eye and ear.</li> <li>➤ Draw a well label diagram of ear &amp; eye.</li> </ul>
Evaluation :
<ul style="list-style-type: none"> <li>➤ Unit test for 50 marks once unit is completed.</li> </ul>
Bibliography :
<ul style="list-style-type: none"> <li>➤ Ross &amp; Wilson – Anatomy &amp; Physiology in health &amp; illness.</li> <li>➤ P.V. publication – text book of Anatomy and Physiology.</li> </ul>

## LESSON PLAN

SUBJECT : -BIO-SCIENCE

Unit: - XII - THE SENSE ORGANS

TOPIC: - ANATOMY OF NOSE AND TONGUE

GROUP: -G.N.M.FISRT YEAR

PLACE: - Class room

Date & Time:-

Duration:- 60Min.

Teaching Method:-Lecture cum Discussion

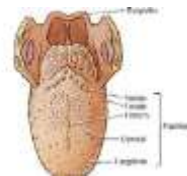
AV Aids:- Black Board and chalk with Projector

Students Pre requisite : - The students have little knowledge about STURCTURE AND FUNCTIONS of Nose and Tongue

General Objective: -At the end of the unit, the students will be able to explain the of ANATOMY OF NOSE AND TONGUE.

Specific Objective : - At the end of the class students will be able to

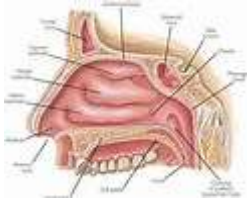
- Describe position and structure of tongue
- Explain nerve supply & Types of test from tongue
- Describe the structure of the Nose
- Describe Function of the Nose

Review of Previous Class		Ask Question regarding ORGANS OF SPECIAL SENSE and its importance OF ITS KNOWLEDGE in nursing			
Introduction		The organs of special sense are specially adapted end-organs for the reception of certain kinds of stimuli. The nerves which supply them form the means by which sensory impressions are carried from the sense organs to brain, where sensation is interpreted. Some sense impressions arise.			
S.No	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1	20 min.	Describe anatomical position of tongue	<p>The tongue is principally concerned in the special sense of taste. It is largely composed of muscle which is in two groups . the intrinsic muscles of the tongue perform all the delicate movements, and the extrinsic muscles attach the tongue to surrounding parts and perform the larger movements such as those form and important part of mastication and swallowing. The food is turned about by the tongue, pressed against the palate and teeth, and finally passed into the pharynx.</p> <p>The tongue lies in floor of the mouth, at its root the vessels and nerves pass in and out, the tip and margins of tongue are in contact with the lower teeth, and the dorsum is the arched surface on top of the tongue, When the tongue is turned up, the under surface, the frenulum</p>	<p>T.- Describe the TONGUE WITH THE help of Black Board</p> <p>S- ListenParticipateand note.</p> 	Q.- Describe the structure of tongue.

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p>linguae, a soft ligamentous structure which attaches the posterior part of the tongue to the floor of the mouth, can be seen. The anterior portion of the tongue is free. When protruded the tip of the tongue becomes pointed, but when lying in the floor of the mouth and relaxed the tip is rounded</p> <p><b>THE UPPEER SURFACE (DORSUM OF THE TONGUE.)</b></p> <p>The mucous membrane of the tongue is moist and pink in health. On the upper surface it has a velvety appearance and is covered by papillae, of which there are three varieties.</p> <p><b>THE UPPEER SURFACE (DORSUM OF THE TONGUE.)</b></p> <p><b>(I)Circumvallate papillae.</b> Of these there are from eight to twelve placed at the base of tongue. These are the largest and each one is surrounded by a little moat-like depression. These papillae are arranged in a V-shaped at</p>		

S.No	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
2	10 min.	TYPES OF TASTES AND TONGUE	<p>the back of the tongue</p> <p><b>(II)Fungiform papillae</b> are distributed over the tip and sides of the tongue, and are fungoid in shape</p> <p><b>(III)Filliform papillae</b> are the most abundant and are found over whole surface of the tongue.</p> <p>The end- organ of taste are the taste buds which are very numerous in the walls of the circumvallate and fungiform papillae, the filiform papillae are concerned more with the sense of touch rather and actual taste. Taste buds are also contained in the mucous membrane of the palate and pharynx</p> <p>All food must be in liquid form before it can be tasted, and it must actually come into contact with the nerve endings capable of receiving the different stimuli. Different taste buds give rise to different tastes. Those placed at the tip of the tongue are sensitive to sweetness those at the base to bitter, and at the top and sides to sour tastes, whilst the taste of salt can be stimulated fairly universally over the whole tongue.</p>	<p>T.- Describe nervous supply and test of TONGUE WITH THE help of Black Board</p> <p>S- ListenParticipateand note.</p>	<p>Q.- Describe nerve supply and test of tongue?</p>



S.No	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
4	5min	Explain function of nose	<p>membrane of the nasal cavities which is known as the olfactory portion of the nose. It is lined with highly specialized cells from which minute fibrils pass to arborize with fibres from the olfactory bulb. The olfactory bulb, which actually an outlying portion of the brain, is the slightly bulbous (enlarged) portion of the olfactory nerve tract which lies above the cribriform plate of the ethmoid bone. From the olfactory bulb sensation is passed along the olfactory tract by several relaying stations until it reaches the final receiving area in the olfactory</p> <p>centre which lies in the temporal lobe of the cerebral hemisphere where the sensation is interpreted.</p> <p>The sense of smell is stimulated by gases inhaled or by small particles. It is a very delicate sense, and becomes easily dead ended when exposed to any one odour for some time. Persons in a stuffy room rapidly become oblivious to the unpleasant odours, which strike others forcibly on entering the room from the fresh air. The sense of smell is also lessened if the nasal mucous membrane is very dry, very wet or swollen, as in a cold in the head. Smells are described as pleasant or unpleasant.</p>	 <p>T.- Explain function of Nose WITH LCD Projector. S- Listen &amp; Takes note.</p>	Q.- Describe function of Nose?

	10 Min	Summary	The end-organs for the reception of certain kinds of stimuli. The nerves form the sense from stimuli to brain, where sensation is interpreted.		
		Assignment	Write in detail structure and functions of tongue and nose.		
		Evaluation	<ul style="list-style-type: none"> <li>- Easy Type Question</li> <li>- Short type question</li> </ul>		
		Bibliography	<p>1.PR Ashalata and G Deepa (text book of anatomy and physiology for nurses) jaypee publication</p> <p>2.S.S.RANDHAWA biological science (peevee books)</p>		



## LESSON PLAN

Subject: Anatomy and Physiology

Topic: Physiology of vision

Group: GNM I year

Place: Class room

Teaching method: lecture cum discussion method

A.V. Aids: Black board and chalk, chart

Student Pre-requisite: Students have little knowledge about structures of eye and physiology of vision

General objective: At the end of class students will be able to in deeply knowledge about physiology of vision

Specific objective: At the end of class students will be able to

1. Enlist various structure of Human Eye
2. Describe anatomy and physiology of various structure of Human Eye
3. Enumerate Accessories organs for protection & Smooth function of Eye
4. Explain the functions of various mussels related of Eye
5. Define visual perception
6. Describe about some defects of vision.

Review of class:

Ask the question about structure of eye to know level of knowledge of student about eye before describing physiology of vision.

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
1.	2 mins	Enlist various structure of Human Eye	<p>Eyeball is situated in anterior part of orbital cavity and is almost spherical in shape. Each eyeball consists of following structures:</p> <div><div><div>A. The sclera</div><div>B. The cornea</div></div><div>}</div><div>Fibrous coat</div><div><div>C. The choroid</div><div>D. The ciliary body</div><div>E. The iris</div></div><div>}</div><div>Vascular coat</div><div><div>F. The retina</div><div>G. The aqueous humor</div><div>H. The lens</div><div>I. The vitreous body</div></div><div>}</div><div>Nervous coat</div><div>Refractive media</div></div>	<p>T: explain with board and chalk</p> <p>L: listens and take notes</p>	<p>Q: list structures of eyeball?</p>
2.	20 mins	Describe anatomy and physiology of various structure of Human Eye	<p><b>Sclera</b></p> <p>Posterior 5/6<sup>th</sup> of outer coat of eyeball consists of strong, opaque fibres called sclera. When viewed from front, it is that portion which is referred as “white of the eye”</p> <p>Sclera provides insertion to extraocular muscles (recti and oblique)</p> <p>Sclera is pierced by number of structures. They are: 1. Optic nerve 2. Ciliary nerves and vessels 3. 4-5 choroid veins (venae vorticosae)</p>	<p>T: explain with LCD Projector</p> <p>L: listens and take notes</p>	<p>Q: Describe anatomy and physiology of Eye?</p>

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p><b>Cornea</b>  It forms 1/6<sup>th</sup> of external coat of eyeball. Its junction with sclera is called sclerocorneal junction or limbus. It is more convex than sclera. It is filled with fluid, aqueous humor</p> <p>Cornea is innervated by branches of ophthalmic division of trigeminal nerve, it is sensitive to pain.</p> <p>It consists of following layers:  A. Corneal epithelium- stratified squamous non keratinized type  B. Bowman's membrane- a homogenous layer made of fine fibers  C. Substantia propria- containing collagen fibres. Fibroblasts present in lamina propria are called Keratocytes or corneal corpuscles  D. Descemet's membrane- thin homogenous layer  E. Posterior surface of cornea is lined by single layer of flattened cells-- the endothelium of anterior chamber.  Cornea has no blood vessels. It derives nutrition from 1. Vessels in periphery 2. Direct diffusion from aqueous humor.</p>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p><b>Choroid</b> It is thin pigmented membrane, dark brown in color, which is situated between sclera (externally) and retina (internally)</p> <p><b>Ciliary body</b> It is circular structure continuous with anterior part of choroid. Ciliary body is attached to suspensory ligament which helps to suspend lens in position</p> <p><b>Iris</b> It is pigmented membrane which surrounds pupil of eye. It arises from margin of ciliary body and forms diaphragm with a dark central opening in front of lens Space between cornea and iris is anterior chamber and space between iris and lens is posterior chamber Iris contain well developed ring of muscles called sphincter pupillae. Dilator pupillae is an ill defined sheet of radially arranged fibres. Both are involuntary smooth muscles Sphincter pupillae and ciliary muscle are supplied by parasympathetic fibres coming from Edinger-Westphal nucleus of midbrain, oculomotor nerve and ciliary ganglion</p>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p><b>Retina</b> It is innermost coat of eyeball. It is thin, delicate layer, continuous posteriorly with optic nerve. Outer surface is formed by pigment cells attached to choroid. Inner surface is in contact with hyaloid membrane of vitreous</p> <p>Retina has three parts--- optic, ciliary and iridial. At optic disk there are no rods and cones, so it is called as ‘blind spot’.</p> <p>Retina has 10 layers which includes:</p> <ul style="list-style-type: none"> <li>➤ Pigmented layer</li> <li>➤ Layer of rods and cones</li> <li>➤ Bipolar neurons</li> <li>➤ Ganglion layer</li> <li>➤ Nerve fibre layer</li> </ul> <p>Retina is supplied by a branch of ophthalmic artery-- central artery of retina. Occlusion of this artery leads to total blindness</p> <p>Retina can become partially detached from choroid-- called retinal detachment. It can occur in hypertension or injury to eyeball</p>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p><b>Aqueous humor</b> This is clear fluid which fills the space between cornea and lens. It is secreted in posterior chamber by capillaries of ciliary processes. Fluid reaches anterior chamber, which ultimately reaches canal of Schlemm. Interference with drainage of aqueous humor results in increased intraocular pressure (glaucoma). This leads to atrophy of retina, leading to blindness</p> <p><b>Lens</b> This is firm, transparent and biconvex. It is enclosed in a transparent elastic capsule. It is placed immediately behind iris and pupil. Its function is to focus on the light rays entering through pupil onto retina</p> <p><b>Vitreous humor</b> It is colorless, jelly like transparent substance which fills posterior 4/5<sup>th</sup> of eye. It helps preserve spherical shape and support retina. It is enclosed in a delicate, homogenous hyaloid membrane</p>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
3	4 mins	Enumerate Accessories organs for protection & Smooth function of Eye	<p>Accessory organs for protection and smooth functioning of the eyes are:</p> <ul style="list-style-type: none"> <li>➤ Eyebrows</li> <li>➤ Eyelids</li> <li>➤ Conjunctiva</li> <li>➤ Lacrimal apparatus</li> <li>➤ Muscles of the eye</li> </ul> <p>Lacrimal apparatus includes parts concerned with secretion and drainage of lacrimal fluid. It is made up of following parts:</p> <ul style="list-style-type: none"> <li>● Lacrimal gland and its ducts</li> <li>● Conjunctival sac</li> <li>● Lacrimal canaliculi</li> <li>● Lacrimal sac</li> <li>● Nasolacrimal duct</li> </ul>	<p>T: explain with chart</p> <p>L: listen and take notes</p>	<p>Explain Enumerate Accessories organs for protection &amp; Smooth function of Eye?</p>
4.	4 mins	Explain the functions of various muscles related of Eye	<p>These are muscles which move eyeball:</p> <ol style="list-style-type: none"> <li>1. Four Recti ( Rectus-- straight)</li> <li>2. Two oblique muscles</li> <li>3. Levator Palpebrae Superioris</li> </ol>	<p>T: explain with chalk &amp; board.</p> <p>L: listen and take notes</p>	<p>Q: Explain the functions of various muscles related of Eye?</p>

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
5.	10 mins	Define visual perception	<p>Actions of extraocular muscles:</p> <ul style="list-style-type: none"> <li>● Medial rectus- adducts eyeball</li> <li>● Lateral rectus- abducts</li> <li>● Superior rectus- elevates, adducts and rotates medially</li> <li>● Inferior rectus- depresses, adducts and rotates laterally</li> <li>● Superior oblique- elevates medially rotated eye, abducts and rotates laterally</li> <li>● Levator palpebrae- elevates upper eyelid</li> </ul> <p>It is ability to interpret information and surroundings from visible light reaching the eye. The resulting perception is known as eyesight or vision. The various physiological components involved in vision are referred to collectively as the visual system</p>	<p>T: explain with chalk &amp; board.</p> <p>L: listen and take notes</p>	<p>Q: Define visual perception?</p>



S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p>Visual system in humans allows individuals to assimilate information from environment. The act of seeing starts when lens of the eye focuses an image of its surroundings onto a light sensitive membrane in back of the eye, called retina</p> <p>The retina converts patterns of light into neuronal signals. The lens of the eye focuses light on photoreceptive cells of retina which detect the photons of light and respond by producing neural impulses.</p> <p>These signals are processed in a hierarchical fashion by different parts of the brain, from the retina to the lateral geniculate nucleus, to primary and secondary visual cortex of brain</p> <p>Signals from retina can also travel directly from retina to superior colliculus</p> <p>Visual acuity is acuteness or clearness of vision dependent on sharpness of retinal focus and sensitivity of interpretative faculty of brain</p>		

S No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
6.	10 mins	Describe about some defects of vision	<p>Visual acuity is a quantitative measure of the ability to identify black symbols on a white background at a standardized distance as the size of symbols is varied. In the term <b>20/20 vision</b>, the numerator refers to distance in feet from which a person can reliably distinguish a pair of objects. Denominator is distance at which their separation angle is 1 arc minute</p> <p><b>Lesion in optic Pathway</b></p> <ol style="list-style-type: none"> <li>1. Lesion in optic nerve, produces blindness of affected eye</li> <li>2. Lesion in central part of optic chiasma can cause involvement of nasal fibres of both eyes, i.e. in both eyes, temporal visual field is lost or bitemporal hemianopia occurs. This can occur in patients with pituitary tumors, which can press on the optic chiasma</li> <li>3. Lesions in optic tract: the left optic tract lesion causes right homonymous hemianopia and right optic tract lesion causes left homonymous hemianopia</li> </ol>	<p>T: explain with board and chalk</p> <p>L: listen and takes note</p>	Q: Describe about some defects of vision?

S. No.	Time	Specific objective	Content	Teaching learning activity	Evaluation
			<p>1. Myopia: in this condition, parallel rays coming from a distant object are focused at a point in front of retina. It is corrected by concave lens</p> <p>2. Hypermetropia: when length of eyeball is too short, parallel rays are brought to focus behind retina. It is corrected by convex lens</p> <p>3. Astigmatism: this defect is due to difference in horizontal and vertical axes or curvatures of cornea. As a result image from all portions of object cannot be seen clearly. It is corrected by cylindrical lenses</p> <p>4. Presbyopia: this defect of accommodation is due to loss of elasticity of lens with advanced age. such defect is corrected by using “reading glasses” i.e. Convex lens</p> <p>5. Color blindness: the genes for red and green sensitive pigments of cones are located on X chromosomes. The gene for blue sensitive cone is located on chromosome-7. Color blindness may vary from total color blindness to weakness of one of the primary colors. It can be broadly classified into three:</p> <ul style="list-style-type: none"> <li>➤ Monochromate</li> <li>➤ Dichromate</li> <li>➤ Trichromate</li> </ul>		

Summary and evaluation (10 mins):

- List structures of eyeball with diagram
- Describe physiology of vision alongwith pathway

Assignment: Explain physiology of vision with the help of labeled diagram

Evaluation: class test after completion of lecture

Bibliography: Ashalatha P R. Textbook of Anatomy and Physiology for Nurses. First edition. JAYPEE BROTHERS Medical publishers. New Delhi.  
GJ TORTORA – Text book of Anatomy and Physiology

## LESSION PLAN

Subject : -BIO-SCIENCE

Unit: - I

TOPIC: - PHYSIOLOGY OF SMELL, TOUCH AND TASTE

NAME OF TEACHER: -

GROUP: -G.N.M.FISRT YEAR

PLACE: - Class room

Date & Time:-

Duration:- 60MIN.

Teaching Method:-Lecture cum Discussion

AV Aids:- Black Board and chalk with Projector

Students Pre requisite : - The students have little knowledge about an understanding about Physiology Of Smell, Touch And Taste

General Objective: -At the end of the unit, the student will be explain the Physiology Of Smell, Touch And Taste.

Specific Objective: - At the end of the class students will be able to

- Explain PHYSIOLOGY OF SMELL
- Explain PHYSIOLOGY OF TOUCH
- Explain PHYSIOLOGY OF TASTE

Review of Previous Class		Structure of Nose, Skin and Tongue with their functions.			
Introduction		Describe the importance of SMELL, TOUCH AND TASTE.			
S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1	20 min	Explain Physiology Of Smell	<p><b>Physiology of SMELL (Olfaction)</b></p> <p>Many attempts have been made to distinguish among and classify “primary” sensations of smell. Our ability to recognize about 10,000 different odours probably depends on patterns of activity in the brain that arise from activation of many different combinations of olfactory receptors.</p> <p>Olfactory receptors react to odorant molecules in the same way that most sensory receptors react to their specific stimuli: A generator potential (depolarization) develops and triggers one or more nerve impulses. In some cases, an odorant binds to an <i>olfactory receptor protein</i> in the plasma membrane of an olfactory hair.</p> <p>Olfaction, like all the special senses, has a low threshold. Only a few molecules of certain substances need be present in air to be perceived as an odour. A good example is the chemical methyl mercaptan, cooking and heating is odourless but lethal and potentially explosive if it accumulates, a small amount of methyl mercaptan is added to natural gas to provide olfactory warning of gas leaks. Adaptation (decreasing sensitivity) to odors occurs rapidly</p>	T.- Define with the help of Black Board S- ListenParticipateand note.	Q.- Explain Physiology Of Smell?

S.No	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
1			<p>On each side of the nose, about 40 bundles of the slender, unmyelinated axons of olfactory receptors extend through about 20 olfactory foramina in the cribriform plate of the ethmoid bone. There are 40 or so bundles of axons collectively form the right and left <b>olfactory</b></p> <p><b>(I) nerves.</b> The olfactory nerves terminate in the brain in paired masses of gray matter called the <b>olfactory bulbs</b>, which are located below the frontal lobes of the cerebrum and lateral to the crista galli of the ethmoid bone.</p> <p>Within the olfactory bulbs, the axon terminals of olfactory receptors form synapses with the dendrites and cell bodies of olfactory bulb neurons in the olfactory pathway.</p> <p>Axons of olfactory bulb neurons extend posteriorly and form the <b>olfactory tract</b> Some of the axons of the olfactory tract project to the <b>primary olfactory area</b> of the cerebral cortex; located at the inferior and medial surface of the temporal lobe, the primary olfactory area is where conscious awareness of smell begins). Olfactory sensations are the only sensations that reach the cerebral cortex without synapsing in the thalamus.</p> <p>People who suffer damage in this area have difficulty identifying different odours. Positron emission tomography (PET) studies suggest some degree of hemispheric lateralization: The orbitofrontal area of the <i>right</i> hemisphere exhibits greater activity during olfactory processing.</p>		

S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
2	15 min	Explain Physiology Of Touch	<p><b>SOMATIC SENSATIONS (physiology of touch)</b></p> <p>Somatic sensations arise from stimulation of sensory receptors embedded in the skin or subcutaneous layer; in mucous membranes of the mouth, vagina, and anus; in muscles, tendons, and joints.</p> <p>The inner ear. The sensory receptors for somatic sensations are distributed unevenly—some parts of the body surface are densely populated with receptors, and others contain only a few. The areas with the highest density of somatic sensory receptors are the tip of the tongue, the lips, and the fingertips. Somatic sensations that arise from stimulating the skin surface are <b>cutaneous sensations</b></p> <p>There are four modalities of somatic sensation: tactile, thermal, pain, and proprioceptive.</p> <p><b>Touch</b></p> <p>The <b>tactile sensations</b> (TAK-ti<sup>-</sup>l; <i>tact</i>- _ touch) include touch, pressure, vibration, itch, and tickle. Although we perceive differences among these sensations, they arise by activation of some of the same types of receptors mediate.</p> <p>Sensations of touch, pressure, and vibration. Other tactile sensations, such as itch and tickle sensations, are detected by free nerve endings attached to small-diameter, unmyelinated fibers.</p> <p>Sensations of <b>touch</b> generally result from stimulation of tactile receptors in the skin or subcutaneous layer.</p>	<p>T.- Define with the help of Black Board</p> <p>S-Listen</p> <p>Participate and note.</p>	<p>Q.- Explain Physiology Of Touch?</p>



S.No.	Time	Specific Objective	Content	Teaching Learning Activity	Evaluation
			<p><b>Vibration</b> Sensations of <b>vibration</b>, such as using an electric knife to carve a turkey, result from rapidly repetitive sensory signals from tactile receptors</p> <p><b>Itch</b> The <b>itch</b> sensation results from stimulation of free nerve endings by certain chemicals, such as bradykinin or antigens in mosquito saliva injected from a bite, often because of a local inflammatory response</p> <p><b>Tickle</b> Free nerve endings are thought to mediate the <b>tickle</b> sensation. This intriguing sensation typically arises only when someone else touches you, not when you touch yourself. The solution to this puzzle seems to lie in the impulses that conduct to and from the cerebellum when you are moving your fingers and touching yourself that don't occur when someone else is tickling you</p> <p><b>Thermal Sensations</b> Thermoreceptors are free nerve endings that have receptive fields about 1 mm in diameter on the skin surface. Two distinct thermal sensations—coldness and warmth—are detected by different receptors. Cold receptors are located in the stratum basale of the epidermis and are attached to medium-diameter, myelinated A fibers, although a few connect to small-diameter, unmyelinated fibers. Temperatures between 10_ and 40_ C (50–105_ F) activate cold receptors</p> <p><b>Pain Sensations</b> Pain is indispensable for survival. It serves a protective function by signalling the presence of</p>		

noxious, tissue

damaging conditions. From a medical standpoint, the subjective description and indication of the location of pain may help pinpoint the underlying cause of disease.

### **Types of Pain**

There are two types of pain: fast and slow. The perception of **fast pain** occurs very rapidly, usually within 0.1 second after a stimulus is applied, because the nerve impulses propagate along medium-diameter, myelinated A fibers. This type of pain is also known as acute, sharp, or pricking pain. The pain felt from a needle puncture or knife cut to the skin is fast pain. Fast pain is not felt in deeper tissues of the body. The perception of **slow pain**, by contrast, begins a second or more after a stimulus is applied. It then gradually increases in intensity over a period of several seconds or minute s.

### **Localization of Pain**

Fast pain is very precisely localized to the stimulated area. For example, if someone pricks you with a pin, you know exactly which part of your body was stimulated. Somatic slow pain also is well localized but more diffuse (involves large areas); it usually appears to come from a larger area of the skin

### **Proprioceptive sensations**

Proprioceptive sensations allow us to know where our head and limbs are located and how they are moving even if we are not looking at them, so that we can walk, type, or dress without using our eyes.

### **Kinesthesia**

Kinesthesia is the perception of body movements.

Proprioceptive sensations arise in receptors

termed

3	15 min	<p><b>Explain</b> <b>PHYSIOLOGY OF TASTE</b></p>	<p><b>proprioceptors.</b> Those proprioceptors embedded in muscles (especially postural muscles) and tendons inform us of the degree to which muscles are contracted, the amount of tension on tendons, and the positions of joints.</p> <p><b>Physiology of Gestation(taste)</b> Chemicals that stimulate gustatory receptor cells are known as <b>tastants</b>. Once a tastant is dissolved in saliva, it can make contact with the plasma membrane of the gustatory hairs, which are the sites of taste transduction. The result is a receptor potential that stimulates exocytosis of synaptic vesicles from the gustatory receptor cell. In turn, the liberated neurotransmitter molecules trigger nerve impulses in the first-order sensory neurons that synapse with gustatory receptor cells. The receptor potential arises differently for different tastants.</p> <p>The threshold for taste varies for each of the primary tastes. The threshold for bitter substances, such as quinine, is lowest. Because poisonous substances often are bitter, the low threshold (or high sensitivity) may have a protective function. The threshold for sour substances, such as lemon, as measured by using hydrochloric acid, is somewhat higher. The thresholds for salty substances, represented by sodium chloride, and for sweet substances, as measured by using sucrose, are similar, and are higher than those for bitter or sour substances. Complete adaptation to a specific taste can occur in 1–5 minutes of continuous stimulation. Taste adaptation is due to changes that occur in the taste receptors, in olfactory receptors, and in neurons of the gustatory pathway in the CNS.</p>	<p>T.- Define with the help of Black Board S-Listen Participate and note</p>	<p>Q.- Explain Physiology Of Taste?</p>
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			<p><b>The Gustatory Pathway</b>  Three cranial nerves contain axons of the first-order gustatory neurons that innervate the taste buds.  The <b>facial (VII) nerve</b> serves taste buds in the anterior two-thirds of the tongue;  the <b>glossopharyngeal (IX) nerve</b> serves taste buds in the posterior onethird of the tongue;  and the <b>vagus (X) nerve</b> serves taste buds in the throat and epiglottis</p> <p><b>Perception of taste.</b>  From the taste buds, nerve impulses propagate along these cranial nerves to the <b>gustatory nucleus</b> in the medulla oblongata. From the medulla, some axons carrying taste signals project to the <b>limbic system</b> and the <b>hypothalamus</b>; others project to the <b>thalamus</b>.</p> <p>Taste signals that project from the thalamus to the <b>primary gustatory area</b> in the parietal lobe of the cerebral ,give rise to the conscious perception of taste.</p>		
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### Summary : & Evaluation (10 min)

On each side of the nose, about 40 bundles of the slender, unmyelinated axons of olfactory receptors extend through about 20 olfactory foramina in the cribriform plate of the ethmoid bone. There are 40 or so bundles of axons collectively form the right and left **olfactory**. Somatic sensations arise from stimulation of sensory receptors embedded in the skin or subcutaneous layer; in mucous membranes of the mouth, vagina, and anus; in muscles, tendons, and joints. Chemicals that stimulate gustatory receptor cells are known as **tastants**. Once a tastant is dissolved in saliva, it can make contact with the plasma membrane of the gustatory hairs, which are the sites of taste transduction

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Assignment : Describe Physiology of Smell, Touch And Taste
Evaluation : <ul style="list-style-type: none"><li>- Easy Type Question</li><li>- Short type question</li></ul>
Bibliography : <ul style="list-style-type: none"><li>➤ Ross &amp; Wilson – text book of Anatomy &amp; Physiology</li><li>➤ P.R Ashalatha G.Deepa.</li></ul>

## LESSON PLAN

Subject : Anatomy & Physiology

Unit : XIII The Skelton

Topic : formation and growth of bones Topic No 305

Group : I<sup>st</sup> GNM Students

Place : Class-Room

Date & Time : 60 minutes

Teaching method : Lecture cum discussion.

AV aids / instructional aids : White board, Projector.

Student Pre requisite : The students have an understanding about basic tissues and types of connective tissue.

General Objective : At the end of class the students will be able to clearly understand the formation and growth of bones.

Specific Objectives : At the end of class the students will be able to-

- Enlist the functions of the skeleton system.
- Describe the steps of intra membranous ossification and endochondral.
- Describe how long bone grows in length and thickness.

Review of previous class : In previous class we have understand the types of tendons, ligaments and cartilage and their functions. Do you have problem regarding above mention topic. Tell me.

### Introduction:

We all know muscles are very important in our body as muscles our bones are also equally important so today we will learn about bones growth and development and functions of bones.

Bone or osseous tissue contains a great deal of inter cellular substance surrounding widely separated cells. Four types of cells are characteristic of bone tissue namely osteogenic cells, osteoblasts, osteocytes & osteoclasts, The process by which bone forms in the body is called ossification. Ossification begins around sixth or seventh week of embryonic life & continues through out adulthood.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Enlist the functions of the skeleton system	Function of the skeleton system – <ul style="list-style-type: none"> <li>➤ Support</li> <li>➤ Assistance in movement</li> <li>➤ Mineral storage</li> <li>➤ Blood cell formation</li> <li>➤ Storage of Energy.</li> <li>➤ Protection</li> </ul>	T: Explain on white board.  S: Listen and taken notes.	Mr. Tell me the functions of the skeleton system.?
2.	25 min	Describe the steps of inter-membranous and endochondrious	The process by which bone forms is called ossification or osteogenesis. Ossification begins during the sixth week of embryonic development and follows are of two patterns – <ol style="list-style-type: none"> <li>a.) Intra-membranous ossification</li> <li>b.) Endochondral ossification</li> </ol> Interamembranous ossification – <ul style="list-style-type: none"> <li>➤ The soft sports and flat bones are formed in this way. In which mesenchyme arranged in resemble membrane (In sheet like layers)</li> <li>➤ It occurs following steps – <ol style="list-style-type: none"> <li>1. Development of the ossification center.</li> <li>2. Calcification</li> <li>3. Formation of trabeculae</li> <li>4. Development of the periosteum.</li> </ol> </li> </ul>	T: Explained through projector.  S: Listening and watching video & taken notes.	Any one of you tell me the intramembranous ossification?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	Describe how long bone grows in length and thickness.	<p>Endochondral ossification –</p> <ul style="list-style-type: none"> <li>➤ It means bone formation within hyaline cartilage that development from mesenchyme.</li> </ul> <ol style="list-style-type: none"> <li>1. Development of the cartilage model</li> <li>2. Growth of the cartilage model</li> <li>3. Development of the primary ossification center.</li> <li>4. Development of the medullary cavity.</li> <li>5. Development of the secondary ossification centers.</li> <li>6. Formation of articular cartilage and the epiphyseal plate.</li> </ol> <p>During childhood, bones throughout in the body grow in thickness by –</p> <ul style="list-style-type: none"> <li>➤ Oppositional growth, and long bones lengthen by the addition of bone. Material on the diaphyseal side of epiphyseal plate by Interstitial growth.</li> </ul> <p>Growth in length –</p> <ul style="list-style-type: none"> <li>➤ Epiphyseal plate is a layers of lyaline eastilage it consists of four zones –</li> </ul>		<p>Bone growth in length is called..... growth, and bone growth in diameter (Thickness) is called..... growth.</p>



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			a.) Zone of resting cartilage. b.) Zone of proliferating cartilage. c.) Zone of hypertrophic cartilage d.) Zone of calcified cartilage growth in thickness – Bone grows in thickness or diameter due to the addition of new bone tissue by persisted osteoblasts around the outer surface of the bone. (Appositional growth)		

Summary : & Evaluation (10 min)

- So now we know the importance of skeleton system its functions are protection support, formation of blood cells, help in movement, mineral homeostasis and triglyceride storage. We also understood the interstitial growth and appositional growth.

Assignment :

- All of you must make a assignment on “details describe on ossification of a bone”

Evaluation :

- End of this unit of you participate in a test of 50 marks to evaluate your understanding regarding this topic.

Bibliography :

- Tortora principle of A &P.
- Ashlata text book of A & P.
- Ross and Wilson A & P health and illness.

## LESSON PLAN

Subject : Anatomy & Physiology

Unit : XIII The Skelton

Topic : Tendon,

Group : I<sup>st</sup> GNM Students

Place : Class-Room

Date & Time : 60 minutes

Teaching method : Lecture cum discussion.

AV aids / instructional aids : White board, Video.

Student Pre requisite : The students have an understanding about basic Knowledge of tendons.

General Objective : At the end of class the students will be able to describe the tendon effectively.

Specific Objectives : At the end of class the students will be able to-

- Define tendon and its types.
- Demonstrate structure of a tendon.
- Know about Tendon sheath.

Review of previous class : Are you remember the connective tissue and types of connective tissue

### **Introduction:**

Epimycium, perimycium & endomycium of a skeleton muscle extends beyond the muscle fiber & called as a tendon. A tendon attaches a muscle to another structure such as bone or other muscle. Tendons of a muscle causes stretching of a muscle & structures attached to it so the movement of skeleton muscle occur.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	20 min	Define Tendon and its types	<p><b>Definition</b></p> <ul style="list-style-type: none"> <li>➤ Tendon is a white, thick , tough fibrous card of dense regular connective tissue that, attaches skeleton muscles to bone..</li> <li>➤ Tendons stretch as the muscles and help in supporting and movement.</li> <li>➤ Ligaments – Bone to bone</li> <li>➤ Apo neuroses – Sheet like tendon that attach muscle to muscle.</li> </ul> <p><b>Positional Tendon</b></p> <ul style="list-style-type: none"> <li>➤ Help in maintaining position like writing and holding.</li> </ul> <p><b>Energy Stories</b></p> <ul style="list-style-type: none"> <li>➤ Help with movement and in recovering and storing energy efficiently.</li> </ul> <p><b>Structurally</b></p> <ul style="list-style-type: none"> <li>➤ According to shape they can be flat, wide, ribbon shaped <ol style="list-style-type: none"> <li>1) Tendon Sustain high tensile loads.</li> <li>2) Flexible to allow changes in direction of muscle pull.</li> </ol> </li> <li>➤ Tendons are made by connective tissue. A complete tendon is built by multiple layers of connective tissue.</li> <li>➤ The structure of the tendon and muscles are differently connected and intervened.</li> </ul>	<p>T: Explain on white board.</p> <p>S: Listen and taken notes.</p>	<p>Q. Anyone tell me the name of connective tissue that makes tendon?</p>

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
2.	20 min	Demonstrate structure of a tendon	<p>➤ There are mainly four layers deep to superficial are-</p> <ol style="list-style-type: none"> <li>1) Endomysium</li> <li>2) Perimysium</li> <li>3) Epimysium</li> <li>4) Deep Fascia.</li> </ol> <p>Each of the four layers are composed primarily of collagen.</p> <p>The cord like bundle of tendon collagen extends out of the muscle and attaches to the layers of connective tissue, that surrounds the bones.</p>	<p>T: Explain on Projector.</p> <p>S: Listening, watching &amp; taken notes.</p>	Tell me correct sequence of connective tissue layers starting with the deepest.
3.	10 min	Know about the tendon sheath	<p>➤ In Specific tendon there is one additional structural element is found.</p> <p>➤ Many large and crucial tendon come together in a small space so that, move rhythmically during activities like walking and running.</p> <p>➤ These tendons are encased in a layer of connective tissue called a tendon sheath.</p> <p>➤ The tendon sheath contain a slippery film of synovial fluid that acts to smooth movement and deduce frictions.</p>	<p>T: Explain on white board.</p> <p>S: Listen and taken notes.</p>	Why tendon sheath is useful in running?

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ Today we learn about important of tendon structure of tendon type of tendons as well as Tendon Sheath. If anyone have any question please tell me so we can again discuss and understand.</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Define a tendon? Write about different types of Tendons &amp; its function.</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ After finishing the skeleton system all of you have to participate in a test of 50 marks.</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Ross and Wilson anatomy and physiology in health and illness.</li> <li>➤ Nandan Bansal anatomy Hindi</li> <li>➤ Tortora, Principles of anatomy 2 Physiology.</li> </ul>

## LESSON PLAN

Subject : Anatomy & Physiology

Unit : XIII The Skelton

Topic : cartilage and ligament, Topic No 307

Group : I<sup>st</sup> GNM Students

Place : Class-Room

Date & Time : 60 minutes

Teaching method : Lecture cum discussion.

AV aids / instructional aids : White board, projector.

Student Pre requisite : The students have an understanding about tendons.

General Objective : At the end of class the students will be able to differentiate structures, types and functions of cartilage and ligaments.

Specific Objectives : At the end of class the students will be able to-

- Define cartilage.
- Types of cartilage and their functions.
- Describe ligaments its functions and types.

Review of previous class : Anyone tell me about tendon and its types briefly.

### **Introduction:**

Think about yours knees and elbows for a minutes. First bend your arms and legs as far as you can. Now straighten your limbs. yours muscles are able to freely move your legs and arms using the knee and elbow joints. Now this time bend your elbows and knees again in either direction. Can you do it? we will learn the importance of ligaments and cartilage today. So that we can know the answer.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	10 min	Define Cartilage	<p>Cartilage –</p> <ul style="list-style-type: none"> <li>➤ Cartilage is a type of specialized connective tissue, made up of chondroitin sulfate (ground substance) collagen fibers, lacunas and chondrocytes.</li> <li>➤ Do not have blood vessels, nerve and lymphatic vessels in its extra cellular matrix.</li> <li>➤ Provides – Flexibility and great tensile strength.</li> </ul>	<p>T: describe on White board.</p> <p>S: Listen watching and making notes.</p>	Mr. x – tell me What is cartilage?
2.	20 min	Types of cartilage and functions	<p>Hyaline Cartilage –</p> <p>Bluish white with fine collagen fibers and many chondrocytes –</p> <ul style="list-style-type: none"> <li>➤ Perichondrium – present.</li> <li>➤ weakest among all types of cartilage.</li> <li>➤ Location.- ends of long bones, ribs, larynx, trachea etc.</li> </ul> <p>Function – Provide flexibility, support, reduces friction absorbs shock.</p> <p>Fibrous cartilage –</p> <ul style="list-style-type: none"> <li>➤ Lacks perichondrium</li> <li>➤ chondrocytes scattered among bundles of collagen fibers within the extra cellular matrix.</li> </ul> <p>Strongest cartilage among all types of cartilage.</p> <p>Exp.- Pubic symphysis, Intervertebral discs menisci of knee etc.</p>	<p>T: Explain on projector.</p> <p>S: Listening, watching &amp; taken notes.</p>	Q. Any one of you tell me the types of cartilages?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	Describe ligament and their Function and types.	<p>Functions – support and fusion.</p> <p>Elastic cartilage –</p> <ul style="list-style-type: none"> <li>➤ Chondrocytes located in a thread like network of elastic fibers within the extra cellular matrix.</li> <li>➤ perichondrium – present</li> </ul> <p>Location – Auricle, epiglottis, eustachian tubes etc.</p> <p>Function – Strength and elasticity and maintain the shape of structure.</p> <p>Ligament –</p> <ul style="list-style-type: none"> <li>➤ Ligaments are bundle of connective tissue that connect one bone to an adjacent bone. consists of fibrocystic and ground substance collagen fibers are arranged in parallel bundles and are attachment to the periosteum.</li> </ul> <p>Functions – Provide strong attachment and stability between structure or joint help in movement in sequence and prevent from dislocation.</p> <p>Type – White ligament – Is rich in collagenous fibers.</p> <p>Yellow ligament – is rich in elastic fibers.</p>	<p>T: Explain on projector.</p> <p>S: Listening, watching &amp; taken notes.</p>	<p>Q. Mrs..... Described Ligament?</p>



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			Types In knee joint – <ul style="list-style-type: none"> <li>➤ Extra capsular ligaments               <ul style="list-style-type: none"> <li>a.) medical collateral ligament</li> <li>b.) Lateral collateral ligament</li> </ul> </li> <li>➤ Intra capsular ligaments               <ul style="list-style-type: none"> <li>a.) Anterior cruciate ligament</li> <li>b.) Posterior cruciate ligament.</li> </ul> </li> </ul>		
Summary : & Evaluation (10 min) <ul style="list-style-type: none"> <li>➤ Today we learn about cartilage and type of cartilage such as hyaline, elastic and fibrous cartilage and ligaments that connects bone to bone and prevent dislocations.</li> </ul>					
Assignment : <ul style="list-style-type: none"> <li>➤ I am going to divide you in group tomorrow we have a debate on today's topic see which group wins.</li> </ul>					
Evaluation : <ul style="list-style-type: none"> <li>➤ After finishing the skeleton system all of you have to participate in a test of 50 marks.</li> </ul>					
Bibliography : <ul style="list-style-type: none"> <li>➤ Ross and Wilson anatomy and physiology in health and illness.</li> <li>➤ Nandan Bansal anatomy Hindi</li> <li>➤ Tortora, Principles of anatomy 2 Physiology.</li> </ul>					

## LESSON PLAN

Subject : Bio-Science

Unit : 13 - The skeleton

Topic : Classification of Bone & Joints.

Group : GNM I<sup>st</sup> year

Place : Class – Room

Date & Time : 60 minutes

Teaching method : Demonstration.

AV aids / instructional aids : White board, models & PPT.

Student Pre requisite : The students have a little understanding about characteristics of Bone & Joint.

General Objective : At the end of the class the students will be able to describe the classification of Bone & Joint.

Specific Objectives : At the end of the class the students will be able to

- Explain the classification of Bone & Joint
- Explain type of Bone & Joints.
- Explain various types of joints.

Review of previous class : Any one can explain about skeleton system.

### Introduction:

- All of you remember the functions and structure of skeleton. Now today we are going to discuss the classification of bone & Joints & also try to understand various type of Bone & their Joint.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	Knowledge of total Number of Bones.	<p>There are total 206 Bones in human body:</p> <ul style="list-style-type: none"> <li>➤ Upper Limbs-64</li> <li>➤ Lower Limbs-62</li> <li>➤ Vertebrae-33(C<sub>7</sub> T<sub>12</sub> L<sub>5</sub> S<sub>5</sub> CO<sub>4</sub>)</li> <li>➤ Skull – 22</li> <li>➤ Ribs – 24</li> <li>➤ Sternum – 01</li> </ul>	Lecture & Demonstration watching, Listening & taking notes.	How many bone make the lower limb? What is a sesamoid bone?
2.	20 min	Explain type of Bones.	<p>According to position –</p> <ul style="list-style-type: none"> <li>➤ Axial skeleton – Bones forming the axis of the body e.g.- Ribs, Skull, sternum, vertstron.</li> <li>➤ Appendicular skeleton- Bones forming the skeleton of appendages or limbs.</li> </ul> <p>According to size and shape:</p> <ul style="list-style-type: none"> <li>➤ Long bones e.g.- femur, humrus.</li> <li>➤ Short bones e.g.- tarsal, carpals.</li> <li>➤ Flat bones e.g.- Scapula, sternum.</li> <li>➤ Irregular bones (bones having large air filled spores)- Maxilla, frontal, ethmoid.</li> <li>➤ Sesamoid bones- “Seed-like” bones seen in tendon. e.g.- patella, pisiform.</li> </ul>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	5 min	Define the six subtypes of synovial joints.	<ol style="list-style-type: none"> <li>1. Gliding Joints <ul style="list-style-type: none"> <li>➤ Joint between Humerus &amp; patella, joint between carpal bones.</li> </ul> </li> <li>2. Hinge Joints <ul style="list-style-type: none"> <li>➤ Flexion &amp; Extension ( Uni-axial or Mono-axial)</li> </ul> </li> <li>3. Pivot Joints <ul style="list-style-type: none"> <li>➤ Rotation only (Mono-axial)</li> </ul> </li> <li>4. Condyloid Joints <ul style="list-style-type: none"> <li>➤ Bi-axial – Flexion, Extension, Abduction, Adduction, &amp; Circumduction.</li> </ul> </li> <li>5. Saddle Joints <ul style="list-style-type: none"> <li>➤ Bio-axial, Flexion, Extension, abduction, Adduction &amp; circumduction.</li> </ul> </li> <li>6. Ball &amp; Socket Joints <ul style="list-style-type: none"> <li>➤ Multi – axial , Flexion, Extension, abduction, Adduction &amp; circumduction &amp; rotation.</li> </ul> </li> </ol>	<p>Lecture &amp; Demonstration</p> <p>Watching listening &amp; taking Notes &amp; asking question?</p>	Asking questions related to taught topics.

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ Now we are understand about the types of various bone &amp; classification of Joints. How they acts in human body. What is physiology of bone &amp; Joints.</li> <li>Q.1. Explain types of bone ?</li> <li>Q.2. How many total bones are present in body?</li> <li>Q.3. Enlist name of long bone?</li> <li>Q.4. Enlist name of Vertebral Bone?</li> <li>Q.5. Explain the classification of joint?</li> <li>Q.6. How many types of joints are present in human books?</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Prepare a chart on classification of bone &amp; Joint. Tomorrow group discussion would be Conducted tomorrow on this topic among all of you. so be ready for it.</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Asking Various questions to no. of students about taught topic.</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Tortora – Principles of anatomy &amp; Physiology.</li> <li>➤ Asha Lata – Text book of anatomy &amp; physiology for Nursing.</li> <li>➤ Ross &amp; Wilson – Anatomy &amp; Physiology in health &amp; illness.</li> </ul>

## LESSON PLAN

Subject : Bio- Science

Unit : Skeletal system

Topic : Joint movement (309)

Group : GNM First Year.

Place : Class – Room

Date & Time : 60 minutes

Teaching method : Lecture Cum Demonstration.

AV aids / instructional aids : Chalk – Board, Chart, PPT.

Student Pre requisite : The student have some knowledge about joint & joint movement.

General Objective : At the end of the lesson students will be able to gain knowledge regarding joint movement

Specific Objectives : At the end of the class the students will be able to

- Define Joint.
- Classify the joint.
- Explain the type of movement
- Explain the special movement.

Review of previous class:

- Ask the students if any know regarding joint & joint movement, & type of movement.

### Introduction:

- Ask the student if they know the joint, joint type & type of movement.
- Also mention the objectives of the lesson to the student here.
- A joint is a point of contact between bones, between bones & cartilages or between bones and teeth. The joint's structure determines how it functions. Some joints permit no movement, other permit slight movement and still other afford considerable movement. The scientific study of joints is referred as arthrology.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	To define Joint.	Definition – ➤ Joint is a junction between two or more bones or cartilage come together It is device to permit movement.	T: Lecture cum Discussion.  S: Listen and Take notes.	What do you mean by Joint?
2.	5 min	To classify of Joint.	Classified of joint – ➤ three major type of joint – <ol style="list-style-type: none"> <li>1. Structurally as fibrous – two bone that are united by fibrous connective tissue – have no joint.</li> <li>2. Cartilaginous joint – two bones joint with hyaline cartilage.</li> <li>3. Synovial joint – most mobile type of joint synovial joint are divided in six type of joint –               <ol style="list-style-type: none"> <li>a.) plane</li> <li>b.) Saddle</li> <li>c.) hinge</li> <li>d.) pirot</li> <li>e.) ball &amp; socket</li> <li>f.) ellipsoid</li> </ol> </li> </ol>	T: Lecture cum Discussion with help of chart.  S: Listen and Take notes.	Would you tell me type of joint?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	To explain the type of movement.	<ul style="list-style-type: none"> <li>➤ Movement at synovial joint can be describe as mono-axial occurring one direction, bi-axial-occurring in two direction, multi-axial-occurring many direction .</li> <li>➤ Direction movement also known as anatomical movement joint movement can be divided in to –               <ul style="list-style-type: none"> <li>a.) angular movement</li> <li>b.) Rotation</li> <li>c.) Special movement</li> </ul> </li> </ul> <p>Angular movement –</p> <ul style="list-style-type: none"> <li>➤ involve either an increase or a decrease in the angle between articulating bones.               <ul style="list-style-type: none"> <li>1. Flexion – A movement decreasing the angle between articulating bones synovial joints that                   <ul style="list-style-type: none"> <li>a.) permit flexion – 1.) Ball &amp; Socket</li> <li>2.) Candyloid</li> <li>3.) hinge</li> <li>4.) Pirot</li> <li>5.) Saddle</li> </ul> </li> <li>2. Extensive – A movement increasing the angle between articulating bone, synovial joint that permits extension.</li> </ul> </li> </ul>	<p>T: Explain with PPT</p> <p>S: Listen &amp; take notes.</p>	Would you tell me type of movement?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>a.) Ball &amp; Socket</li> <li>b.) Condylod</li> <li>c.) Hinge</li> <li>d.) Pirot</li> <li>e.) Saddle</li> </ul> <p>3. Hyper extension – a movement to increase the angle between articulating bone to take a body part or limbs beyond Its normal range –</p> <ul style="list-style-type: none"> <li>a.) ball &amp; socket</li> <li>b.) condylod.</li> </ul> <p>4. Abduction – A movement a way from the midline of the body i.e. –</p> <ul style="list-style-type: none"> <li>a.) Ball – Socket</li> <li>b.) Condylod</li> <li>c.) Saddle</li> </ul> <p>5. Adduction – A movement towards the mid–line of the body i.e. –</p> <ul style="list-style-type: none"> <li>a.) Ball – Socket</li> <li>b.) Condylod</li> <li>c.) Saddle</li> </ul> <p>6. Circumduction – Conical movement of a limb extending from the joint (e.g.– shoulder or hip joint) true circumduction allow for 3600 of movement.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	20 min	Explain the special movement	<p>7. Rotation – A movement in which something e.g.- bone or a whole limb. pivot or revolve around a single long axis i.e. – a.) ball &amp; Socket</p> <p>Special Movement –</p> <ul style="list-style-type: none"> <li>➤ Special movement only occur at certain joints rather than at certain types of joints</li> </ul> <p>8. Elevation – The upward movement of structure of the body e.g.- shoulder joint raises the corresponding arm vertically upwards –</p> <p>a.) Shrugging shoulder to elevation of the scapula.</p> <p>9. depression – The downward movement of structure of the body e.g. – a.) shoulder lower the corresponding area vertically downwards. i.e. – Opening the mouth by moving the jaw down depression of the mandible.</p> <p>10. Protraction – The movement of a body part in the anterior direction i.e.-forwards</p> <p>a.) Crossing arm protraction of clavicals.</p>	<p>T: Explain with PPT.</p> <p>S: Listen &amp; Take notes.</p>	Would you tell me type of special movement?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>11. Retraction – The movement of a body part in the posterior direction. i.e.- backwards.</p> <p>12. Eversion – A movement in which the plantar surface of the foot away from the mid-line of the body. Eversion of the soles of the feet so that they turn outwards to face away from each other.</p> <p>13. Inversion – A movement in which the plantar surface of the foot inversion can occur. Inversion of the soles of the feet so that they turn inwards towards each other.</p> <p>14. Dorsiflexion – Backward flexion (bending).</p> <p>15. Plantar flexion – Forwards flexion or bending as of the heel of foot.</p> <p>16. Pronation – Turning the hand so that the palm is downward or facing posteriorly (In anatomical position).</p> <p>17. Supination – turning the hand so that the palm is upward or facing anteriorly (in anatomical position)</p>		

Summary : & Evaluation (10 min)	➤ Today I explained joint type of joint structure & joint movement after completion the lesson we have discussed about whole topic & Satisfied answer given by student.
Assignment :	➤ Write in details about Classification & function of joints.
Evaluation :	➤ Unit test for 50 marks once the unit is completed.
Bibliography :	➤ Ross & Wilson – Text book of Anatomy & physiology for nurses. ➤ P.R. Ashalatha, G.Deepa - Text book of Anatomy & physiology for nurses.

## LESSON PLAN

Subject : Bio- Science

Unit : Skeletal system

Topic : Axial skeletal

Group : GNM First Year.

Place : Class – Room

Date & Time : 60 minutes

Teaching method : Lecture Cum Demonstration.

AV aids / instructional aids : Chalk – Board, Chart, PPT.

Student Pre requisite : The student have a little knowledge about axial skeletal

General Objective : At the end of the lesson students will be able to gain knowledge regarding axial skeletal.

Specific Objectives : At the end of the class the students will be able to

- Define axial skeletal.
- Enlist the name of skull & facial bone.
- Explain the bone of vertebral column.
- Explain the bone of thoracic cage.

Review of previous class:

- Students were asked questions about bone & joints.

### **Introduction:**

- Ask the student if they know the skull bone, facial bone pectoral bone. thoracic cage, vertebral column.
- Also mention the objectives of the lesson to the student here.
- The bones of Human skeleton are divided in two groups:-
  1. The appendicular skeleton - It includes all the bones that form the upper and lower

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min	To define axial skeletal	<p>Definition –</p> <ul style="list-style-type: none"> <li>➤ Axial skeletal includes all the bone along the body's long axis such as skull, face, vertebral column &amp; thoracic cage.</li> </ul> <p>The axial skeleton includes all the bones of the head, Trunk &amp; vertebral column.</p>	<p>T: Lecture cum Demonstration.</p> <p>S: Listen and Take notes.</p>	What is axial skeleton?
2.	10 min	Enlist the total number of bone axial skeleton	<p>Axial skeleton consist of 80 bones –</p> <ol style="list-style-type: none"> <li>1. Skull – 8 bones</li> <li>2. Facial – 14 bones</li> <li>3. Hyoid (Neck) – 01 bone</li> <li>4. Ear ossicles – <u>06 bones</u></li> </ol> <p>29 bones.</p> <ol style="list-style-type: none"> <li>5. Vertebral column – 26 bones</li> <li>6. Thorax – 1. Ribs - 24</li> <li>2. <u>Sternum - 01</u></li> </ol> <p>80 bones</p>	<p>T: Lecture cum Demonstration with help of chart.</p> <p>S: Listen and Take notes.</p>	Would you tell me number of bone in axial skeleton?

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
3.	20 min	Explain the bone of skull	<p>Skull Bones –</p> <ul style="list-style-type: none"> <li>➤ The skull consist of the cranial bone &amp; facial skeleton.</li> <li>➤ The cranial bones composed the top &amp; back of the skull &amp; enclosed the brain.</li> </ul> <p>The Facial skeleton –</p> <ul style="list-style-type: none"> <li>➤ Makes up the face of the skulls</li> </ul> <p>a.) Facial skeleton – The 14 bones of facial skeleton form the entrance to the respiratory &amp; digestive tracts facial skeleton is formed by -</p> <ol style="list-style-type: none"> <li>1.) mandible - 1</li> <li>2.) Maxillae - 2</li> <li>3.) Zygomatic -2</li> <li>4.) Lacrimal - 2</li> <li>5.) Nasal - 2</li> <li>6.) Vomer - 1</li> <li>7.) Palatine -1</li> <li>8.) Nasal conchae -2</li> </ol> <p>Cranial Bone –</p> <ul style="list-style-type: none"> <li>➤ The eight cranial bones support &amp; protect the brain the cranial bone are –</li> </ul> <ol style="list-style-type: none"> <li>1. Occipital bone – 1,</li> <li>2.) Parietal bone – 2</li> <li>3. Temporal bone – 2,</li> <li>4.) Frontal bone – 1</li> <li>5. Ethmoid bone – 1,</li> <li>6.) Sphenoid bone –1</li> </ol> <p>These eight bones are joined by permanent joint called suture.</p>		Would you tell me number in cranial & Lumbar vertebral?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
4.	10 min	Enlist the bone of vertebral column.	<ul style="list-style-type: none"> <li>➤ The four major cranial sutures are –               <ol style="list-style-type: none"> <li>1.) Lamboidal suture – In between occipital bone parietal bone.</li> <li>2.) Coronal suture – In between the frontal &amp; parietal bone.</li> <li>3.) Sagittal suture – In between two parietal bones</li> <li>4.) Squamous suture – in between the temporal parietal bones.</li> </ol> </li> <li>➤ The vertebral column – It is made up of 26 vertebrae</li> <li>➤ The vertebral column is grouped in five regions –               <ol style="list-style-type: none"> <li>1.) Cervical vertebrae : 7 at neck = C01- C07</li> <li>2.) Thoracic vertebrae : 12 back of thorax = T01 – T012</li> <li>3.) Lumbar vertebrae : 5 from the Lumber= L01 – L05</li> <li>4.) Sacral vertebrae : 1 one</li> <li>5.) Coccygeal vertebral : 1 one</li> </ol> </li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
5.	5 min	Enlist the bone of Thoracic cage	<p>The bone of Thoracic cage –</p> <ul style="list-style-type: none"> <li>➤ The thoracic cage , formed by the ribs &amp; sternums, protect internal organ &amp; give attachment .</li> <li>➤ The sternum consist of manubrium, body &amp; xiphoid process ribs 1–7 are called true ribs, between they articulate directly to the sternum &amp; ribs 8–12 are known as false ribs.</li> </ul>		

**Summary : & Evaluation (10 min)**

- Today we have discussed about axial skeleton system & bones associated with axial skeleton system.

**Assignment :**

- Write the name of bone of axial skeleton describe skull bone in detail.

**Evaluation :**

- Unit test for 50 marks once the unit is completed.

**Bibliography :**

- Ross & Wilson – text book of Anatomy & Physiology
- P.R Ashalatha G.Deepa.

## LESSON PLAN

Subject :	Bioscience (Anatomy & Physiology)
Unit :	XIV – Muscular system
Topic :	Types of muscles
Group :	G.N.M. 1 <sup>st</sup> year students
Place :	Classroom
Date & Time :	60 minutes
Teaching method :	Lecture and demonstration
AV aids / instructional aids :	Black board & Chalk, Models & Chart
Student Pre requisite :	Knowledge about skeletal system and importance of muscles
General Objective :	At the end of the class students will be able to describe about types of muscles.
Specific Objectives :	At the end of the class students will be able to:- <ol style="list-style-type: none"><li>1. To explain briefly about the classification of muscles</li><li>2. To describe types of muscles</li><li>3. To enlist major muscles in the human body.</li></ol>
Review of previous class :	Ask questions regarding knowledge about working of skeletal system and muscles.

Introduction:

Ask the students if they know about muscles.  
Tell them about importance of muscles.  
Brainstorm about how muscles play an important role in body mechanics.  
Mention the objectives of the lesson to the students.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 Min.	To explain briefly about the classification of muscles	<b>Classification of muscle :-</b> <ol style="list-style-type: none"> <li>Functionally <ol style="list-style-type: none"> <li>Voluntary</li> <li>Involuntary</li> </ol> </li> </ol> <b>Voluntary muscle:-</b> can be moved at will eg. Skeletal muscle. <b>Involuntary muscle:-</b> cannot be moved at will or consciously eg. Smooth and cardiac muscle <ol style="list-style-type: none"> <li>Structurally <ol style="list-style-type: none"> <li>Striated</li> <li>Smooth</li> </ol> </li> </ol> <b>Striated muscle:-</b> have stripes across the muscle fibre eg. Skeletal or cardiac muscle <b>Smooth muscle:-</b> no striations eg. Smooth muscles	T : lecture cum demonstration S : listens & observes	Review Ans. By Students
2	5 Min.	To describe types of muscles.	<b>Types of muscles</b> <ol style="list-style-type: none"> <li>Skeletal/striated/voluntary muscles</li> <li>Smooth/ visceral muscles</li> <li>Cardiac /involuntary muscle</li> </ol>	T : lecture cum demonstration S : listens & observes	
3	40 Min.	To enlist major muscles in the human body..	<b>Major muscles of human body:-</b> The human body has over 600 muscles. Out of these 10 muscles or major muscle groups that encompass the body from head to toe in descending order.	T : lecture cum demonstration S : listens & observes	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>These are as follows:</p> <p><b>Deltoids</b>  Located in the shoulders, your deltoids are active in lifting a heavy box over your head, or holding your arms out to the side.</p> <p><b>Pecs</b>  Short for pectoralis, your pecs are the muscles in your chest. They're active during a push-up. When teaching kids, we call these the gorilla muscles. Kids like to pound on their chest while yelling "Pecs," like the call of the wild.</p> <p><b>Biceps</b>  These are the muscles in the arms that kids typically go to when asked to flex their muscles. I've caught many kids rolling up their sleeves and sizing up their biceps during my classes.</p> <p><b>Triceps</b>  The triceps are located on the back of the upper arm. Unlike the biceps, the triceps don't often get activated in every day life. Therefore, exercises like triceps dips or swimming are necessary to strengthen the triceps.</p> <p><b>Abs</b>  Short for abdominals, your stomach area muscles are key to core strength. A fun way to help kids notice</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>their abs is to have them pretend to laugh hard. As they fall back on the floor laughing hysterically, have them feel the muscles on their belly tense up.</p> <p><b>Obliques</b> The muscles of the abdominal wall do a lot of overlapping and crisscrossing. For the purpose of teaching kids, it's best to generalize that the obliques are located on the sides of the stomach area. When you bend and twist your torso, you're activating the obliques.</p> <p><b>Gluteus Maximus</b> Known by many snickering kids as the tushie or Heini muscle, this hefty rear-end muscle group helps you climb stairs and ride a bike.</p> <p><b>Quads</b> Short for quadriceps, these muscles on the front of the thigh get plenty of action in daily life. Every time you stand from a sitting position you're using your quads. A sure way for kids to feel their quads working is by having them do a wall sit. By holding a sitting position against a wall for 30 seconds or so, they'll experience the sensation of their quads engaging.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b>Hamstrings</b>  Located on the back of the thigh, the hamstrings are those muscles you feel when bending over to touch your toes. They're often very tight, even in children, and in need of regular flexibility exercises. Kids can strengthen the hamstrings by walking backwards.</p> <p><b>Gastrocnemius</b>  This hard-to-pronounce muscle is better known as the calf muscle. Activities like jumping rope, running, in-line skating, and others that require flexion at the ankle will engage the gastrocnemius. This is the perfect muscle in which to stump a grown-up, since its true name is not commonly known.</p>		

**Summary : & Evaluation (10 min)**

- Classify the muscular system in a broad way.
- List types of muscles in the human body.
- Point out the difference between voluntary and involuntary muscles.
- How the major muscles are placed in the body.

**Assignment :** List and explain major muscles groups in the human body.

**Evaluation :** Class test once this topic is completed

**Bibliography :**

1. Gray's Anatomy & Physiology for students – 3<sup>rd</sup> Edition - Richard & Drake
2. A Text book of Biological Sciences ( Anatomy & Physiology ) – 2015 edition –SS Randawa ( Pee Vee publication )
3. Anatomy & physiology in health 7 illness -12<sup>th</sup> edition –Anne Waugh & Alison Grant.



## LESSON PLAN

**Subject** - Bioscience

**Unit** - xiv – Muscular system

**Topic** – Structure of muscle.

**Class / Group** - I<sup>st</sup> Yr.G.N.M.

Place - Classroom

Date & Timing - 60 Minutes

Teaching method – Lecture cum Demonstration

A .V aids / Instructional aids – black board, chart, model, projector.

Students Pre requisite – The students should have knowledge about connective tissues & cell.

General objective – At the end of the class the students will be able to understand about the structure of muscle fibre.

Specific objectives – At the end of the class students will be able to

1. To describe the structure of skeletal muscle.
2. To demonstrate structure of a single cell of muscle ( myofibril).
3. To differentiate between structure of different types of muscle.

Review of previous class - Asked questions regarding previous class.

**Introduction :**

Ask the students if they know types of muscles and connective tissues.

Also mention the objectives of the lesson to the students here.

S.No.	Time	Specific Objective	Content	Teaching & Learning Activities	Evaluation
1.	10 Min	To describe the microscopic anatomical structure of a muscle fibre.	<p>Each muscle fibre (cell) of a skeletal contains hundreds of Myofibrils, (contractile element) , surrounded by Sarcoplasmic Reticulum.</p> <p>Each myofibril has thin &amp;thick filaments ,arranged in compartments called Sarcomeres.</p> <p>These filaments are the contractile proteins namely Actin (thin filament) and Myosin (thick filament) which form darker bands alternate with lighter bands.</p>	<p>T : lecture cum demonstration S : listens &amp; observes.</p>	<p>Q: Describe the structure of a</p>

S.No.	Time	Specific Objective	Content	Teaching & Learning Activities	Evaluation
2.	40 Min.	To describe the structure of muscles in association with connective tissues.	<p>Skeletal muscle is</p> <ul style="list-style-type: none"> <li>Composed of striated muscle cells(muscle fibre) and connective tissue</li> </ul> <p>-most muscles attach to 2 bones that have a movable joint between them.</p> <ul style="list-style-type: none"> <li>The attachment to bone that does not move is the origin.</li> <li>The attachment to the bone that moves is the insertion.</li> </ul> <ul style="list-style-type: none"> <li>Tendons anchor muscle firmly to bones. Tendons are made of dense fibrous connective tissue.</li> <li>Ligaments connect bone to bone at a joint.</li> <li>Bursae : small fluid filled sacs that lie between some tendons &amp; the bones beneath them. They are made of connective</li> </ul>	<p>T : lecture cum discussion. S :listens notes the point.</p>	<p>Q: explain the association of connective tissues with the muscle fibres.</p>

			<p>tissues &amp; are lined with synovial membranes that secrete synovial fluid .</p> <ul style="list-style-type: none"> <li>• Contribution of the nervous system <ul style="list-style-type: none"> <li>- Impulses travel from the cerebrum via motor nerves to the muscle fibres and cause them to contract.</li> <li>- Impulses are integrated in cerebrum (conscious muscle sense ) and in the cerebellum (unconscious muscle).</li> </ul> </li> </ul>		
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**Summary : & Evaluation (10 min)**

Discussed the anatomical cum microscopical structure of muscle.  
Differentiate the structure of different muscle groups in the human body

**Assignment :**

Describe the anatomical structure of muscle fibre in the human body.

**Evaluation :**

Class test (written) once this topic is completed

**Bibliography :**

1. Gray's Anatomy & Physiology for students – 3<sup>rd</sup> Edition - Richard & Drake
2. A Text book of Biological Sciences ( Anatomy & Physiology ) – 2015 edition –SS Randawa ( Pee Vee publication )
3. Anatomy & physiology in health & illness -12<sup>th</sup> edition –Anne Waugh & Alison Grant.

## LESSON PLAN

Subject : Biosciences

Unit : xiv

Topic : Functions of muscles

Group : GNM 1st year

Place : classroom

Date & Time : 60 minutes

Teaching method : lecture & demonstration

AV aids / instructional aids : black board & chalk, LCD projector & ppt.

Student Pre requisite : The students should know about structure & types of muscles.

General Objective : At the end of the class the students will be able to describe the functioning of diff.muscle.

Specific Objectives : At the end of the class the students will be able to :

1.Know about muscle characteristics.

2.Properties of muscle.

3.Main functions of muscle.

Review of previous class : To ask students whether they know about the types & structure of muscles.

### Introduction:

- Ask students if what they know about the structure & types of muscles in various activities of the body.
- Tell them about the importance of functioning of the muscular system in human body.
- Mention the objectives of the lesson to the students here.

S.No	Time	Specific Objective	Content	Teaching Learning activity	Evaluation
1.	5 Min.	To introduce about the muscle characteristics.	Muscle is the only body tissue with the specialized tissues within the body that serve their purpose primarily by contracting. This contraction is accomplished when muscle tissue employs the protein actin & myosin which slide past each other to create movement.	T. Lecture  S. Listen & Talk notes	Review previous class
2.	5 Min.	To list out properties of muscle.	Properties of muscles :- ➤ IRRITABILITY = ➤ CONTRACTIBILITY= ➤ EXTENSIBILITY= ➤ ELASTICITY=		
3.	40 Min.	To list out main functions of the muscular system.	<ul style="list-style-type: none"> <li>▪ Movement or locomotion.</li> <li>▪ Maintenance of posture &amp; muscle tone.</li> <li>▪ Protects the bones &amp; internal organs.</li> <li>▪ Heat production or homeostasis.</li> <li>▪ Helps in carrying out respiration, swallow, digest our food &amp; pump blood through our bodies.</li> <li>▪ Create shape to our body.</li> </ul>		

Summary : & Evaluation (10 min)

- Summaries about major role/characteristics of muscles & its properties.
- List out properties of muscles & functions of muscles.3
- Different between functions of diff kinds of muscles.

Assignment :

- Describe functions of major muscles of human body.

Evaluation :

- Class test and oral test.

Bibliography :

1. Gray's Anatomy & Physiology for students – 3<sup>rd</sup> Edition - Richard & Drake
2. A Text book of Biological Sciences ( Anatomy & Physiology ) – 2015 edition –SS Randawa ( Pee Vee publication )
3. Anatomy & physiology in health & illness -12<sup>th</sup> edition –Anne Waugh & Alison Grant.



## LESSON PLAN

Subject : Bio-Science – Anatomy & Physiology

Unit : XIV Muscular system

Topic : Origin & Insertion of muscles

Group : GNM First Year

Place : Class room

Date & Time : 60 minutes

Teaching method : Lecture cum discussion

AV aids / instructional aids : PPT & Charts

Student Pre requisite : Students should have knowledge of muscles types, structure & Function of muscles.

General Objective : At the end of the lecture the student will gain the knowledge regarding origin & Insertion of chief muscles of the body.

Specific Objectives : On the completion of the teaching programme the students will be able to-

1. Enlist chief muscles of the body.
2. Describe position of muscles the body.
3. Identify origin & insertion.

Review of previous class:

- Ask question about muscular tissue, skeleton muscles Anatomy & Physiology.

**Introduction:** Describe the types of muscles

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	2 min.	Introduce the topic to student	➤ In skeletal muscles movement one end of it remains stationary with bone and pull another and for movement we can describe it on origin & insertion as following –	Lecture Cum demonstration	What is origin & insertion?
2.	5 min.	Define the origin & insertion	1. Origin – origin in the one end of the muscles which remain fixed during its contracts. 2. Insertion – Insertion in the another of the muscle which moves during its contraction. To understand it we can give example of spring on a door. The part of the spring attached to the frame in the origin and part attached to the door represents the insertion.	S. Listens & Observes	
3.	43 min.	Describe origins & Insertion in various chief muscles of the body.	Occipitofrontalis – (Scalp muscles) ➤ Origin – Epicranial aponeurosis ➤ Insertion – Skin superior to supraorbital margin ➤ Orbicularis oris (mouth) Origin – Muscle fibres surrounding opening of mouth. Insertion – skin at corner of mouth. ➤ Buccinators – (Mouth) Origin – Alveolar processes of maxilla & mandible and pterygomandibular raphe. Insertion – orbicularis oris	Lecture Cum demonstration  S. Listens & Observes	

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Masseter – (mouth) Origin – Maxilla &amp; zygomatic arch. Insertion – Angle &amp; ramus of mandible.</li> <li>➤ Sterno cleidomastoid muscle (neck) Origin – Skeleton head, manubrium of sternum clavicular head, medial third of clavicle. Insertion – mastoid process of temporal bone &amp; lateral half of superior nuchal line of occipital bone.</li> <li>➤ Rectus abdominis (abdomen) Origin – pubic crest &amp; pubic symphysis. Insertion – Cartilage of ribs 5.7 &amp; xiphoid process.</li> <li>➤ External oblique (abdomen) Origin – Ribs 5-12 Insertion – Iliac crest &amp; linea alba.</li> <li>➤ Internal oblique (abdomen) Origin – Iliac crest, inguinal ligament &amp; thoracolumbar fascia. Insertion – cartilage of ribs 7-10 and linea alba.</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<ul style="list-style-type: none"> <li>➤ Diaphragm (torso) Origin – xiphoid process of sternum, costal cartilage &amp; adjacent portions of inferior six ribs, lumbar vertebrae &amp; their intervertebral disc. Insertion – central tendon.</li> <li>➤ Ext. &amp; Intercostal (chest) Origin – superior &amp; interior border of ribs. Insertion – Superior &amp; interior border of ribs</li> <li>➤ Trapezius –(thoracic) Origin – Superior nuchal line of occipital bone spine of C<sub>7</sub> to T<sub>12</sub> Insertion – Clavicle &amp; acromion &amp; spine of scapula.</li> <li>➤ Deltoid – (Shoulder) Origin – Acromial extremity of clavicle, acromion of scapula. Insertion – Deltoid tuberosity of humerus.</li> <li>➤ Biceps brachii (Arm) Origin – Long head originates from tubercle above glenoid cavity of scapula. Short head originates from coracoid process of scapula. Insertion – Radial tuberosity of radius &amp; biceps aponeurosis.</li> <li>➤ Triceps brachii (Arm) Origin – Long head originates from infraglenoid tubercle, a projection inferior to glenoid cavity of scapula</li> </ul>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Insertion – Olecranon of ulna.</p> <ul style="list-style-type: none"> <li>➤ Gluteus maximus (Hips) Gluteus maximus origin – from gluteal suture of Ilium behind the posterior gluteal line, sacrum &amp; coccyx insertion gluteal tuberosity of femur.</li> <li>➤ Quadriceps femoris (Biggest muscles of the body) origin – Anterior inferior Iliac spine. Insertion – Tibial tuberosity via patella ligament.</li> <li>➤ Sartorius – Origin - anterior superior iliac spine. Insertion – Medial surface of body of tibia.</li> </ul>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ Muscular system is responsible to produce movement. Each muscle for that attach with two surface origin, which is fix site and insertion point in attach with movable bone. Both are at proximal (origin) and distal (insertion) site.</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Define with example origin &amp; insertion of muscles?</li> <li>➤ Describe origin &amp; insertion of various mark of the body?</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Define with example origin &amp; insertion of muscles?</li> <li>➤ Describe origin &amp; insertion of various mark of the body?</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Anatomy &amp; Physiology (2014<sup>th</sup> edition) Gerard J. Tortora &amp; Bryan Derrickson.</li> <li>➤ Anatomy &amp; Physiology (10<sup>th</sup> edition) Rose &amp; Wilson</li> <li>➤ Text book of Anatomy &amp; Physiology : Gary A Thibodeau.</li> <li>➤ Human Anatomy (4<sup>th</sup> edition) B.D. Chaurasia.</li> </ul>

## LESSON PLAN

Subject : Bio-Science – Anatomy & Physiology

Unit : 14- The muscular system

Topic : Action of muscle

Group : GNM First Year

Place : Class – Room

Date & Time : 1 hour

Teaching method : Lecture cum discussion

AV aids / instructional aids : Black-board, Projector(PPT) & Charts

Student Pre requisite : Students should have knowledge of muscles system, structure & types.

General Objective : At the end of the class the student will be able to know about action of the muscles.

Specific Objectives :

1. Explain about physiology of skeleton muscles.
2. Enumerate & discuss the various types of terminology of movement of muscles & Joint.
3. Describe various actions of the muscles.

Review of previous class:

**Introduction:** Ask the students what they know muscular system introduction, action, definition

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min.	Introduce the topic to student	<ul style="list-style-type: none"> <li>➤ In our muscles movement the skeletal muscles one end become fix at stable bone called origin. Where as another end is attached with movable bone. Contracts for movement called the action.</li> </ul>	Lecture Cum demonstration	Q. Introduce action of muscles?
2.	5 min.	Define the action	<p>Definition Action – The action of a muscle are the main movements that occurs when the muscle contracts i.e. – flexion, extension, Rotate, elevate etc.</p>		Q. Define the action?
3.	40 min.	Describe action of various chief muscles of the body.	<p>Occipitofontalis – (Scalp muscles)            Action – Draws scalp anteriorly raise eye browns and wrinkle skin of forehead horizontally as in look of surprise.</p> <ul style="list-style-type: none"> <li>➤ Orbicularis oris (mouth)                Action – close &amp; protrudes lips as in kissing, compress lips against teeth and shapes lips during speech.</li> <li>➤ Buccinators (Mouth)                Action – Press cheek against teeth and lips as in whistling, blowing and sucking, draws corner of mouth laterally and assists in mastication (Chewing) by keeping food between the teeth.</li> </ul>		Q. Describe action of chief muscles of the body in detail?



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Masseter (Mouth) Action – Elevates mandible as in closing mouth.</p> <p>Sternocleidomastoid muscle –(Neck) Action – Acting bilateral, flex cervical portion of vertebral column. extend head at all auto-occipital joints acting singly (unilateral) laterally flex neck and head to some side and rotate head to side opposite contracting muscles. Laterally rotate &amp; flex head to opposite side of opposite contracting muscles. posterior fibres of muscles can assist in extension of head.</p> <p>Rectus abdominals (Abdomen.) Action – Flexes vertebral column, specially lumbar portion and compress abdomen to aid in defecation, urination, forced exhalation and child birth flexes pelvis on the vertebral column.</p> <p>External oblique (Abdomen.) Action – Acting together (in lateral), compress abdomen and flex vertebral column, help in rotate vertebral column.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Internal oblique (Abdomen.) Action – Acting together, compress abdomen &amp; flex vertebral column, help in rotate vertebral column.</p> <p>Diaphragm (Torso) Action – by contracting &amp; relaxing help in respiration (inhalation &amp; exhalation)</p> <p>External &amp; Internal intercostal muscles (Thorax) Action – by contracting and relaxing of this muscles elevates ribs and increases diameter of thoracic cavity, help in inhalation &amp; exhalation respiration.</p> <p>Trapezius – back &amp; neck &amp; chest. Action – Superior fibres upwards rotate scapula, middle fibres adduct scapula, inferior fibres depress and upwards rotate scapula, superior &amp; inferior fibres together rotate scapula upwards, stabilized scapula.</p> <p>Deltoid (Shoulder) Action – lateral fibres abduct arm at shoulder joint. Anterior flex medially rotate arm at shoulder joint, posterior fibres extend and laterally rotate arm at shoulder joint.</p>		

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p><b>Biceps brachia (Arm)</b> Action – Flex forearm at elbow joint, supinates forearm at radio ulnar joints and flexes arm at shoulder joint.</p> <p><b>Triceps brachii (Arm)</b> Action – Extends forearm at elbow joint and extends arm at shoulder joint.</p> <p><b>Gluteus maximus (Hip)</b> Action – Extension of the knee and the rectus femoris flexes the hip along with the iliopsoas.</p> <p><b>Sartorius (Thigh)</b> Action – Adduction and lateral rotation of thigh, flexion of knee joint.</p>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ As we all know movement is the main function of muscles system origin insertion and action are the part of it.</li> <li>➤ During action the fleshy part of muscles contract and movement occur.</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Introduce and define action of muscles?</li> <li>➤ Describe action of various muscles of the body?</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Introduce and define action of muscles?</li> <li>➤ Describe action of various muscles of the body?</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Anatomy &amp; Physiology (2014<sup>th</sup> edition) Gerard J. Tortora &amp; Bryan Derrickson.</li> <li>➤ Anatomy &amp; Physiology (10<sup>th</sup> edition) Rose &amp; Wilson</li> <li>➤ Text book of Anatomy &amp; Physiology : Gary A Thibodeau.</li> <li>➤ Human Anatomy (4<sup>th</sup> edition) B.D. Chourasia.</li> </ul>

## LESSON PLAN

Subject : Bio-Science – Anatomy & Physiology

Unit : 14 The muscular system

Topic : Introduction & muscular system

Group : GNM First Year

Place : Class – Room

Date & Time : 1 hour

Teaching method : Lecture cum discussion

AV aids / instructional aids : Black-board, Projector(PPT) & Charts

Student Pre requisite : Students should have knowledge of muscles system, structure & types.

General Objective : At the end of the class the student will be able to know about action of the muscles.

Specific Objectives :

1. Explain about physiology of skeleton muscles.
2. Enumerate & discuss the various types of terminology of movement of muscles & Joint.
3. Describe various action of the muscles.

Review of previous class:

**Introduction:** Ask the students what they know the muscles definition, types & action

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
1.	5 min.	Introduce the topic to student	➤ In our muscles movement the skeletal muscles one end become fix at stable bone called origin. Where as another end is attached with movable bone. Contracts for movement called the action.	T. Lecture Cum demonstration  S. Listen & Talk notes	Review of previous class.
2.	5 min.	Define the action	Definition Action – The action of a muscle are the main movements that occurs when the muscle contracts i.e. – flexion, extension, Rotate, elevate etc.		
3.	40 min.	Describe action of various chief muscles of the body.	Occipitofrontalis – (Scalp muscles) Action – Draws scalp anteriorly raise eye brows and wrinkle skin of forehead horizontally as in look of surprise. ➤ Orbicularis oris (mouth) Action – close & protrudes lips as in kissing, compress lips against teeth and shapes lips during speech. ➤ Buccinators (Mouth) Action – Press cheek against teeth and lips as in whistling, blowing and sucking, draws corner of mouth laterally and assists in mastication (Chewing) by keeping food between the teeth.	T. Lecture Cum demonstration  S. Listen & Talk notes	Review of previous class.

S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
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S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Internal oblique (Abd.) Action – Acting together, compress abdomen &amp; flex vertebral column, help in rotate vertebral column.</p> <p>Diaphragm (Torso) Action – by contracting &amp; relaxing help in respiration (inhalation &amp; exhalation)</p> <p>External &amp; Internal intercostal muscles (Thorax) Action – by contracting and relaxing of this muscles elevates ribs and increases diameter of thorax's cavity, help in inhalation &amp; exhalation respiration.</p> <p>Trapezius – back &amp; neck &amp; chest. Action – Superior fibres upwards rotate scapula, middle fibres adduct scapula, inferior fibres depress and upwards rotate scapula, superior &amp; inferior fibres together rotate scapula upwards, stabilized scapula.</p> <p>Deltoid (Shoulder) Action – lateral fibres abduct arm at shoulder joint. anterior flex medially rotate arm at shoulder joint, posterior fibres extend and laterally rotate arm at shoulder joint.</p>		



S.No	Time	Specific objective	Content	Teaching Learning activity	Evaluation
			<p>Biceps brachii (Arm) Action – Flex forearm at elbow joint, supinates forearm a ratio alner joints and flexes arm at shoulder joint.</p> <p>Triceps brachii (Arm) Action – Extends for arm at elbow joint and extends arm at shoulder joint.</p> <p>Gluteus maximus (Hip) Action – Extension of the knee and the rectus fomoris flexes the hip along with the iliopsoas.</p> <p>Sartorius (Thigh) Action – Adduction and lateral rotation of thigh, flexion of knee joint.</p>		

Summary : & Evaluation (10 min)	<ul style="list-style-type: none"> <li>➤ As we all know movement is the main function of muscles system origin insertion and action are the part of it.</li> <li>➤ During action the fleshy part of muscles contract and movement occur.</li> </ul>
Assignment :	<ul style="list-style-type: none"> <li>➤ Assignment of types of muscles</li> </ul>
Evaluation :	<ul style="list-style-type: none"> <li>➤ Introduce and define action of muscles?</li> <li>➤ Describe action of various muscles of the body?</li> </ul>
Bibliography :	<ul style="list-style-type: none"> <li>➤ Anatomy &amp; Physiology (2014<sup>th</sup> edition) Gerard J. Tortora &amp; Bryan Derrickson.</li> <li>➤ Anatomy &amp; Physiology (10<sup>th</sup> edition) Rose &amp; Wilson</li> <li>➤ Text book of Anatomy &amp; Physiology : Gary A. Thibodeau.</li> <li>➤ Human Anatomy (4<sup>th</sup> edition) B.D. Chaurasia.</li> </ul>