



# Paramedical Program

Specialization	Medical Laboratories
Course Number	21107241
Course Title	Histology & micro techniques.
Credit Hours	(3)
Theoretical Hours	(2)
Practical Hours	(3)



### Brief Course Description:

This course introduces the students to the cells and tissue arrangements of the human body. It deal with the study of the micro anatomical structure and function of the body's major organs .It exposes the students to the principles and practices of preparing clinical specimens for histological examination. The focus is put on the procedures used in fixation, decalcification, processing, embedding and microtomy of specimens. Emphasis is also put on the principles and practices used in a laboratory for demonstrating cellular and non-cellular elements in clinical histology specimens.

### Course Objectives:

Upon the completion of the course, the student should be able to:

1. Recognize the basic cells and tissues of the human body.
2. Recognize the histological features of the circulatory and lymphatic systems.
3. Recognize the histological features of the respiratory system.
4. Recognize the histological features of the digestive system.
5. Recognize the histological features of the urinary system.
6. Recognize the histological features of the reproductive system.
7. Recognize the histological features of the endocrine system.
8. Recognize the histological features of the integumentary system.
9. Describe the initial preparation of clinical specimens for histological examination, their storage and/or disposal.
10. Describe fixation and decalcification procedures.
11. Describe paraffin processing.
12. Describe the process for embedding clinical histological specimens.
13. Describe the procedure for cutting clinical histological specimens.
14. Discuss the principles of staining.
15. Perform a routine H&E (Hematoxylin and Eosin) to demonstrate general morphology.
16. Perform special staining techniques to demonstrate specific tissue elements.



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1	The cell	<ul style="list-style-type: none"> <li>- Definition</li> <li>- Structure</li> <li>- Division</li> <li>- Definition of histology</li> <li>- Types of tissue</li> </ul>	
2	Epithelial tissue	<ul style="list-style-type: none"> <li>- types</li> <li>- Function</li> <li>- Location in body</li> <li>- Changes of Epithelial tissue: Gland structure &amp; parts:                             <ul style="list-style-type: none"> <li>a) Endocrine</li> <li>b) Exocrine</li> </ul> </li> </ul>	
3	Connective tissue	1-Properties & function 2-Classification: <ul style="list-style-type: none"> <li>-Adipose tissue</li> <li>-White fiber tissue</li> <li>-Elastic fiber tissue</li> <li>-Aereolar tissue</li> <li>- Reticular tissue</li> <li>-Lymph tissue</li> <li>-Cartilage tissue</li> <li>-Bone tissue</li> <li>-Blood vessels &amp; lymph</li> </ul>	
4	Muscular tissue	1-Classification of muscle : <ul style="list-style-type: none"> <li>- Skeletal muscle</li> <li>- Smooth muscle</li> <li>- Cardiac muscle</li> </ul> 2-Structure of muscular tissue	

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5	Nervous tissue	<ul style="list-style-type: none"> <li>1- Structure of nervous tissue</li> <li>- Nervous fiber</li> <li>- The Nerve</li> <li>- Brain nerves</li> <li>- Brain &amp; spinal cord</li> <li>- 2- Function</li> </ul>	
6	Microscopic structure of organs	<ul style="list-style-type: none"> <li>- Veins and Arteries microscopy</li> <li>- Gastrointestinal tract , accessories gland as liver , pancreas and spleen</li> <li>- Kidney</li> <li>- Ovary &amp; Testis</li> <li>- Skin</li> <li>- Lymph gland</li> <li>- Thymus gland</li> </ul>	
7	<p><b><u>Practical part</u></b></p> <p>Fixation</p>	<ul style="list-style-type: none"> <li>1-Fixation define</li> <li>2-Study of Autolysis , Putrefaction</li> <li>3-Classification of fixation : <ul style="list-style-type: none"> <li>1- Simple</li> <li>2- compound</li> </ul> </li> <li>4-Study of simple fixative like :</li> <li>5- Formalin , Glacial acetic acid , Ethyl alcohol , Mercuric chloride Picric acid , Chromic acid , Potassium dichromate , Trichloroacetic acid osmium tetraoxide</li> </ul>	
8	Decalcification & Tissue processing	<ul style="list-style-type: none"> <li>1. Decalcification methods</li> <li>2. Decalcification solutions : Nitric acid , Formic acid</li> <li>3. End process recognition</li> </ul>	

		<ol style="list-style-type: none"> <li>1- Tissue processing definition &amp; solution are used</li> <li>2- Processing :             <ol style="list-style-type: none"> <li>a) Washing</li> <li>b) Dehydration</li> <li>c) Clearing</li> <li>d) Impregnation</li> <li>e) Embedding</li> </ol> </li> <li>3- Automatic tissue processor</li> </ol>	
9	Microtome	<ul style="list-style-type: none"> <li>- Microtome types</li> <li>- Rotatory microtome , part of mashine</li> <li>- Knife types , Knife sharpening</li> <li>- Sectioning Trouble shooting</li> </ul>	
10	Staining	<ol style="list-style-type: none"> <li>1- Factors that effect staining</li> <li>2- Types &amp; classification of dyes</li> <li>3- Haematoxylin &amp; Eosin stain , structure</li> <li>4- Automated stain machine</li> <li>5- Special stains :             <ul style="list-style-type: none"> <li>-Reticular fiber stain</li> <li>- Trichrome</li> <li>- -Pearls iron stain</li> <li>- Mucicarmine</li> <li>- PAS</li> <li>- Alcian blue stain ,</li> <li>- lipid stain</li> <li>- AFS ,</li> <li>- PTAH ,</li> <li>- Melanin stain ,</li> <li>- Lead salt ,</li> <li>-Verhoeffs method,</li> <li>- Amyliod stain ,</li> <li>- Oil red ( O ) ,</li> <li>- Fontana ,</li> <li>-Immunological stain ,</li> </ul> </li> </ol>	

		<ul style="list-style-type: none"> <li>- Calcium ,</li> <li>-Copper ,</li> <li>-Silver stain</li> </ul>	
11	Mounting & Tissue freezing	<p>1-Mounting</p> <ol style="list-style-type: none"> <li>1- Mounting types &amp; specification</li> <li>2- Goals of mounting</li> <li>3- Mounting procedures</li> <li>4- Labeling of slides &amp; storing</li> </ol> <p>2-freezing</p> <ol style="list-style-type: none"> <li>1. Fast freezing types</li> <li>2. Cryostate machine</li> <li>3. Fast stain solution</li> </ol>	
12	Cytological smears	<ol style="list-style-type: none"> <li>1- Cytology sample :             <ul style="list-style-type: none"> <li>-collection</li> <li>- Specification</li> </ul> </li> <li>2- Smears preparation &amp; method , fixation , staining</li> <li>3- Cytology stain types : PAPA Nicolou , Wright stain , H&amp;E stain</li> </ol>	



**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Practical Exam	10%	--/--/----
	Final Exam	35%Theory 15%Practical	--/--/----

**Teaching Methodology:**

- ❖ Lectures
- ❖ Slides and posters
- ❖ Practice inside labs

**Text Books & References:**

**Reference**

1-**Junque** Kerr, Jeffrey B Functional Histology : Elsevier Science Health Science div Edition: 2nd2009

2- **L.Carlos Junqueira, J. Carneiro, R.O. Kelly** Basic Histology Text and Atlas (Lange Medical Book) **Appleton & Lange,U.S.; 10 edition (1 Dec 2002)**

3- Alan Stevens MBBS FRCPath , James S &. Lowe BMedSci BMBS DM FRCPath **Human Histology: With STUDENT CONSULT Online**  
**Publisher:** Mosby; 3 edition 2004 **ISBN-10:** 0323036635

4-**Luiz Carlos Junqueira (Author), Jose Carneiro**Basic Histology: Text & Atlas: Text and Atlas 2005

