



**Environmental science and health department  
College of science**

**University of Salahaddin**

**Subject: Microtechniques**

**Course Book – (Third stage)**

**Lecturer's name: Khder Hussein Rasul (Theory)**

**Practical lecturer: Azheen Subhi Abdulrahman**

**Academic Year: 2022/2023**

1. Course name	Microtechniques
2. Lecturer in charge	Khder Hussein Rasul
3. Department/ College	Environmental science and health department /Science
4. Contact	e-mail: khder.rasul@su.edu.krd
5. Time (in hours) per week	2 hrs./week (theory)
6. Office hours	To be Return to the schedule on the office door
7. Course code	
8. Teacher's academic profile	<ul style="list-style-type: none"> <li>• I graduated from Salahaddin University in 2007 (Ranked 1<sup>st</sup> in collage), first, I worked as assistant of biology for two years and assist in practical Immunology lab., practical virology lab., practical physiology lab., practical molecular biology lab.</li> <li>• At the end of 2011, I finished my M.Sc. degree in cell biology and have started as assistant Lecturer, teaching practical cell biology and microtechnique.</li> <li>• For 3 years (Between 2012-2015) I had worked as a Member of the Examination Committee for College of Science.</li> <li>• My scientific title changed to lecturer on September 2016 by submitting 3 research articles</li> <li>• From 2016-2019, I worked in Zanco Journal as editor.</li> <li>• <b>PhD in Molecular Genetics 2022</b></li> </ul>
9. Keywords	Microtechniques, slide preparation, histotechnology, Immunohistochemistry, electron microscopy
10. Course overview:	<p>This course is designed to learn and practise students about all details concerning the methods and techniques of slide preparation (microorganisms, animals and plants specimens).</p>
11. Course objective:	<ol style="list-style-type: none"> <li>1. All basic concepts concerning the steps and procedures of slide preparation</li> <li>2. All methods used in slide preparation</li> <li>3. All techniques used for slide preparation</li> </ol>
12. Student's obligation	<p><b>*Exam policy:</b> Student Should take at least one exam during the course; There will be no make-up exams for absences students without medical report.</p> <p><b>*Classroom polices:</b></p> <p><b>1- Attendance:</b> students are strongly encouraged to attend in class on a regular basis, as participation is important to understanding of the material. This is students opportunity to ask questions. <b>Students are responsible for obtaining any information during the class which provided.</b></p> <p><b>2- Lateness:</b> Lateness to class is disruptive</p> <p><b>3- Electronic devices:</b> All cell phones are to be turned off at the beginning of class and put away</p>

during the entire class and don't allow to use internet.

**4-Talking :** During class please refrain from side conversations. These can be disruptive to your fellow students

### 13. Forms of teaching

- Using power point, whiteboard and scientific animations during teaching time
- students will have the complete lecture contents every week

### 14. Assessment scheme

Breakdown of overall assessment and examination

#### Sub final marks

#### Theory (15 marks)

**Exam = 12 marks**

**Quizzes = 3 marks**

#### Final

#### Practical

Assessment Tools	Descriptions	Weight
Quiz	Test during lecture	6
Home Work	A set of tasks assigned to students to be completed outside the classroom.	2
Activities	Students participating during the lab and attendance	2
Mid-term examination	Students will have a written exam related to the previous laboratories	25
Total		35

### 15. Student learning outcome:

After completion of this course,

- Students should know the basic steps in routine slide preparation methods
- Student will know the significance and details of each steps
- Student will have the knowledge about most techniques used in slide preparation
- Student will have the ability to do the techniques by himself and suggest modification in the techniques and alternatives for the materials.

**16. Course Reading List and References:**

- a. Kiernan, J. (1981). Histological and Histochemistry Methods.1st ed. Pergomon press. Oxford.
- b. The world of the cell, Beckman, 2006

**17. Topics**

**Theory**

- 1- Introduction and explaining the course book
- 2- All about Fixation, definition, significance, mechanism
- 3- Materials used in fixation, chemical and physical, postfixation
- 4- Washing, dehydration and clearing
- 5- Infiltration and embedding and types of embedding medium
- 6- Sectioning, types of microtomes, faults and remedy in sectioning
- 7- Staining, theory of staining, routine and special staining, types of staining and classification of stains and dyes.
- 8- Mounting and types of mounting media
- 9- Routine staining of animal and plant tissues
- 10- Methods used in preparing biological slides. sectioning and non-sectioning methods
- 11- Difference between light and electron microscope preparation methods
- 12- Histochemistry and immunohistochemistry
- 13- Light microscopic special techniques
- 14- Special electron microscopic techniques

Lecturer's name

Khder Hussein Rasul  
(2 hrs for each one)

**Practical**

Introduction

Non-sectioning methods

1. Stripping off method

2. Blood smear

3. Maceration and squashing Preparing of onion root tip for studying mitosis

4. Whole mounting

Histological preparation for light microscopy

Paraffin method a. Animal dissection and fixation

b. Dehydration, clearing and infiltration

c. Blocking, trimming and sectioning

First Exam

d. Staining and mounting

Histological preparation for electron microscopy

plastic method a. Fixation and dehydration

b. Clearing, infiltration and embedding

c. Sectioning and staining

Second exam

Final-term Examination

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### 19. Examinations:

Q1/ Answer by (True) or (false):

Q2/ Fill with suitable answers:

Q3/ Write about the following: progressive staining, metachromasia, differentiation, etc

Q4/ Mention the use of the following in slide preparation: xylene, glutaraldehyde, osmium tetroxide, etc...

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### 21. Peer review

### پیداچوونہوی ھاوہل

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

*(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).*

ئەم كۆرسىبووكە دەبىت لەلایەن ھاوھلئىكى ئەكادىمىيە سەپىر بىكرىت و ناوھروكى بابەتەكانى كۆرسەكە پەسەند بىكات و جەند ووشەپەك بنووسىت لەسەر شىاوى ناوھروكى كۆرسەكە و واژووى لەسەر بىكات. ھاوھل ئەو كەسەپە كە زانىارى ھەبىت لەسەر كۆرسەكە و دەبىت پلەى زانستى لە مامۇستا كەمتر نەبىت.

## Course Book