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**Department of Environmental Science and Health**

**College of Science**

**University of Salahaddin**

**Subject: Microtechniques**

**Course Book: 3rd stage**

**Lecturer's name: Assis. Prf. Dr. Chnar Najmaddin Fathullah (Theory)**

**Practical Lecturer: Ass. Lect. Harem Khdir Awla**

**Academic Year: 2023/2024**

Course Book

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| **1. Course name** | Microtechniques |
| **2. Lecturer in charge** | Chnar Najmaddin Fathullah |
| **3. Department/ College** | Biology/Science |
| **4. Contact** | e-mail: chnar.fathulla@su.edu.krd  harem.awla@su.edu.krd |
| **5. Time (in hours) per week**  | Theory2hr./week Practical 2hrs/week |
| **6. Office hours** | To be return to the schedule on the office door  |
| **7. Course code** | SBIO |
| **8. Teacher's academic Profile**  | **Assis. Prf. Dr. Chnar Najmaddin Fathullah CV:**I graduated from Salahaddin Universitey-College of science in 1997. In 2005 I finished my MSc degree at Salahaddin University. |
|  | **PhD. In plant anatomy in 2013** |
| **9. Keywords** | Microtechniques, slide preparation, histotechnology, Immunohistochemistry, electron microscopy |
| **10. Course overview:**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).  |
| **11. Course objective:**1. All basic concepts concerning the steps and procedures of slide preparation
2. All methods used in slide preparation
3. All techniques used for slide preparation
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| **12. Student's obligation**\***Exam policy:** Student Should take 3 exams during the course There will be no make-up exams for absences students without medical report. **\*Classroom polices:****1- Attendance:** Students are strongly encouraged to attend class on a regular basis.2- **Lateness:** Lateness to class is disruptive. |
| **13. Forms of teaching****Face-to-Face (Lectures and PowerPoint)** |
| **14. Assessment scheme**

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| Component | Date | Percent |
| Exam 1 | 00/00/2018 | 25% |
| Exam 2 | 00/00/2019 | 25% |
| Exam 3 | 00/00/2019 | 25% |
| Exam 4 | 00/00/2019 | 25% |
| Total |  | 100% |

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| **15. Student learning outcome:**After completion of this course, you will be able to: * 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.
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| **16. Course Reading List and References‌:****Useful Text books** a. Kiernan, J. (1981). Histological and Histochemistry Methods.1st ed. Pergomon press. Oxford.b. The world of the cell, Beckman, 2006 |
|  Week |  Subject |
| 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 |
| 18. Examples of questionsQ1/ Answer by (True) or (false):Q2/ Fill with suitable answers:Q3/ Write about the following: progressive staining, metachromasia, differentiation, etcQ4/ Mention the use of the following in slide preparation: xylole, glutaraldehyde, osmium tetroxide, etc...**18. Practical** 1) Introduction into the course book2) Smearing ex blood film3) Squash and maceration ex root tip for studying mitosis4) stripping off techniques5) Paraffin method fixation, dehydration clearing and infiltration6) paraffin method, embedding and trimming7) Paraffin, sectioning and stretching 8) Paraffin method, staining9) Electron microscopic procedure, fixation to infiltration and embedding10) EM procedure, Sectioning and staining 11) Microscopic measurements12) Freezing and cryostat microtomy  |