



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Ketingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

Microtechnics

Undergraduate Programme in Biology Education

Module Handbook

Module Name	Microtechnique (Mikroteknik)				
Module level	Undergraduate Programme				
Course Code	02013242008				
Abbreviation, if applicable	-				
Courses included in the module, if applicable	-				
Semester/Term	4 th				
Module coordinator (s)	Dr. Harlita, S.Si., M.Si				
Lecturer (s)	Dewi Puspita Sari,S.Pd., M.Sc				
Language	Bahasa Indonesia (Indonesian Language)				
Classification within the curriculum	Compulsory/ Elective				
Teaching format/class hours per week during the semester	Direct instruction/face to face/blended learning: 26.7h/Week: lecture, laboratory activities, discussion Structured Activity: 32h/Week (Through the case method with analysis of journal articles, current issues and problems of Anatomy and histology of animal microtechnique, through the project-based learning to evaluated laboratory work with specific case in the surrounding and school material) Self-study Activity: 32h/Week (Students learn current issues and problems of microtechniques) Practicum in laboratory: Laboratory activity = 10 topic/week x 170 minutes = 1700 minutes Hour = 1700 minutes/60 minutes = 28.3h				
Workload					
	Type	CS U	Face to Face	Structured Activities	Self-study
	T	2	26.7h (1.00 ECTS)	32h (1.21 ECTS)	32h (1.21 ECTS)
	P	1	28.3h (1.07 ECTS)		
	Total	3	119h (4.5 ECTS)		



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Ketingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

Credit Point	3 CSU (4.5 ECTS)
Requirements	Has taken courses in Engineering Lab, Organic Chemistry, general biology
Learning goals/competencies	CLO 1 Identify and understand the basic principles of cells and tissues and their characteristics, then have the ability to understand and make chemicalia agents, able to operate lab equipment and apply safety laboratories related to the manufacture of microscopic preparations. (PLO 2, PLO 6) CLO 2 Understand, analyze, and apply the principle of making fresh preparations (simple preparations) with replica techniques and hands free and semi-permanent type durable preparations with smear techniques, squash, acetolysis and produce products and able to evaluate them. (PLO 2, PLO 6) CLO 3 Understand, analyze, and demonstrate the techniques of making permanent preparations with wholemount, maceration, embedding techniques. (PLO 2, PLO 6) CLO 4 Understanding, explaining, and applying cell measurement techniques with micrometers and software applications, the development of preparations as detection agents of various kinds of disease. (PLO 2, PLO 6)
Content	Microtechnics is a compulsory subject for a study program that examines: 1. The Fundamental of Microtechniques. 2. Chemical preparation in Microtechniques 3. hand free section and replica preparation 4. Smear Preparation 5. Whole-mount preparation for plant and animal organ 6. Spread Preparation for mast cell 7. Bone maceration preparations 8. Squash preparation for cell reproduction (mitotic phase) 9. Pollen acetolysis preparations 10. Embedding preparations for plants and animals 11. Immunohistochemistry 12. Micrometry applications



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Ketingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

Attribute Soft skill	1. Able to think conceptually, analytically, and logically 2. Have good communication skills												
Study/exam achievements:	Student is required to attend the face-to-face lecture minimum 75% to be able to take Mid and Final exam. Students are considered to complete the course and pass if they obtain at least 60% of maximum final score. The final score (FS) is calculated based on the following ratio: <table> <tr> <th>Aspect</th><th>(%)</th></tr> <tr> <td>Report of Case analysis</td><td>30</td></tr> <tr> <td>Participation and Project</td><td>30</td></tr> <tr> <td>Mid-Term Test</td><td>20</td></tr> <tr> <td>Final Exam</td><td>20</td></tr> <tr> <td>Final Score</td><td>100</td></tr> </table>	Aspect	(%)	Report of Case analysis	30	Participation and Project	30	Mid-Term Test	20	Final Exam	20	Final Score	100
Aspect	(%)												
Report of Case analysis	30												
Participation and Project	30												
Mid-Term Test	20												
Final Exam	20												
Final Score	100												
Form of Media	Power point slide, specimen												
Literature (primary references)	1. Pathak, V., & Rajput, R. (2017). Histological and histochemical studies on the trachea of Gaddi sheep. <i>Himachal Journal of Agricultural Research</i>, 43(2), 126-130. 2. Gahlawat, S. K., Duhan, J. S., Salar, R. K., Siwach, P., Kumar, S., & Kaur, P. (Eds.). (2018). <i>Advances in animal biotechnology and its applications</i>. Springer. 3. Kuehnel, Wolfgang. 2003. Colour Atlas of Cytology, Histology, and Microscopic Anatomy 4 th edition revised and enlarged (e book). Thieme :Germany 4. Jennings, R., Premanandan, C., CIANCIOLO, R., WILKIE, D., WONG, A., & KENDZIORSKI, J. (2017). <i>Veterinary histology</i>. Ohio State University Libraries. 5. O'Dowd, G., Bell, S., & Wright, S. (2019). <i>Wheater's Pathology: A Text, Atlas and Review of Histopathology E-Book</i>. Elsevier Health Sciences. 6. L Mescher, A. (2018). Junqueira's Basic Histology Text and Atlas, FIFTEENTH. 7. Suvarna, K. S., Layton, C., & Bancroft, J. D. (Eds.).												



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Ketingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

	(2018). <i>Bancroft's theory and practice of histological techniques E-Book</i>. Elsevier Health Sciences. 8. Farooqui, M. M., Sharma, C. P., Gupta, V., Kumar, P., & Prakash, A. (2019). Anatomical and Histochemical Studies of Prenatal Prostate Gland in Buck (<i>Capra hircus</i>). <i>Indian Journal of Veterinary Anatomy</i>, 31(1), 01-04. 9. Siswandy, S., Rahmi, E., Masyitha, D., Fitriani, F., Gani, F. A., Zuhrawaty, Z., & Akmal, M. (2020). Histologi, Histomorfometri, dan Histokimia Hati Ayam Buras (<i>Gallus gallus domesticus</i>) Selama Periode Sebelum dan Setelah Menetas. <i>Jurnal Agripet</i>, 20(2). 10. Kapustin, I. V., & Morozov, B. B. (2017). THE DEVICE OF THE SYNCHRONIZATION OF MICROPREPARATION DISPLACEMENT AND ITS PHOTOGRAPHY. <i>Язык и межкультурная коммуникация [Текст]: Сборник статей X международной</i>, 64. 11. Verherbruggen, Y., Walker, J. L., Guillon, F., & Scheller, H. V. (2017). A comparative study of sample preparation for staining and immunodetection of plant cell walls by light microscopy. <i>Frontiers in plant science</i>, 8, 1505. 12. Ewijayanti, G., Setyawan, P., & KURNIAWATI, D. I. (2017). A simple paraffin embedded protocol for fish egg, embryo, and larvae. <i>Scripta Biologica</i>, 4(2), 85-89. 13. Xu, A., & Wei, C. (2020). Comprehensive comparison and applications of different sections in investigating the microstructure and histochemistry of cereal kernels. <i>Plant methods</i>, 16(1), 8. 14. Leitão, C. A. E. (2019). A procedure for correcting the position of plant tissue samples in accidentally polymerized glycol methacrylate resin. <i>Hoehnea</i>, 46(1).
--	---



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kientingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

Presentation Assessment Rubric

Dimension	Weight	Score	WxS	Comments
Material mastery	30%			
The accuracy of solving the problem	30%			
Communication skills	20%			
Ability to deal with questions	10%			
Props/presentations	10%			
Final Score	100%			

DIMENSION	Scale				
	Very Good	Good	Sufficient	Deficient	Very Deficient
	≥85	71-84	60-70	40-59	<40
Organisation	Well organized by presenting facts that are supported by examples that have been analyzed according to the concept	well organized and present convincing facts to support conclusions.	The presentation has focus and presents some evidence to support the conclusion	Sufficiently focused, but insufficient evidence to be used in drawing conclusions	There is no clear organization. Facts are not used to support statements.
Content	Content can inspire listeners to develop their minds.	Contents are accurate and complete. Listeners get new insights about the topic.	Content is generally accurate, but incomplete. Listeners can learn some implied facts, but they don't add new insight into the topic	The content is less accurate, because there is no factual data, it does not add to the listener's understanding	The content is inaccurate or too general. Listeners don't learn anything or are sometimes mislead.
Presentation Style	Speak with passion, transmit enthusiasm and enthusiasm to listeners	The speaker is calm and uses proper intonation, speaks without relying on notes, and interacts intensively with the listener. The speaker always makes eye contact with the listener.	In general the speaker is calm, but with a flat tone and quite often relies on notes. Sometimes eye contact with the listener is ignored.	Based on the notes, no ideas are developed outside the notes, the sound is monotonous	The speaker is anxious and uncomfortable, and reads notes rather than speaking. Listeners are often ignored. There is no eye contact because the speaker is looking more at the whiteboard or screen.

Rubric for Review Article

No	Assessment Aspect	Article 1		Article 2		Article 3	
	Score	High 6-10	Low 1-5	High 6-10	Low 1-5	High 6-10	Low 1-5
1.	Articles come from the indexed journals in the last 3 years.						
2.	Articles related to the theme of learning Microtechniques						
3.	The number of articles at least discusses learning microtechniques						
4.	Accuracy in summarizing the important parts of the abstract						



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kientingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

	of the article						
5.	Accuracy of summarizing important thought concepts in the article						
6.	Accuracy of summarizing the methodology used in the article						
7.	The accuracy of summarizing the research results in the article						
8.	The accuracy of summarizing the discussion of research results in the article						
9.	The accuracy of summarizing the conclusions of the research results in the article						
10.	The accuracy of commenting on selected journal articles						
Total score for each article summary							
Average score obtained							

PROJECT ASSESSMENT FORM

Aspect	Item Indicator	Very Good	Good	Sufficient	Deficient	Very Deficient
		≥85	71-84	60-70	40-59	<40
Material Analysis	Material characteristics					
	Material coverage					
	Depth and breadth of material					
	Material coverage					
Framework	Compatibility of Core Competencies-Basic Competencies					
	Selection of framework					
	Learning steps					
	Thinking skills needed					
Matrix	Conformity of the concept on the matrix					
	Concept interconnection					
	Suitability of learning stages					



UNIVERSITAS SEBELAS MARET
FACULTY OF TEACHER TRAINING AND EDUCATION
BACHELOR OF BIOLOGY EDUCATION STUDY PROGRAM

Building D 3rd Floor FTTE UNS Jl Ir. Sutami No. 36 A Kentingan Surakarta 57126 Indonesia

E-mail: biologi@fkip.uns.ac.id; Website: <https://biologi.fkip.uns.ac.id/en/>

FINAL EXAM

Subject : Microtechniques

Date/time : Monday / 13 December 2021

Lecturer : Dewi Puspita sari, M.Sc

Program / Smt: Biology Education / IV

Time : 120 minutes

Type of exam : *Close books*

1. . Microtechnics requires a balance between the theoretical ability "soft skills" and technical skills "hard skills", please give a description of the relationship between the two abilities and their application in the implementation in the laboratory!
 - b. Give an overview of the types of preparations based on their storage resistance

2. a). How to make the following ingredients:
100 ml HCL 1N, Glycerin jelly for acetolysis, 100 ml Alcohol 45%, Giemsa solution for supravital smear, acetoorcein for squash preparation
 - b). The use of dyes aims to facilitate observation and is usually specific. Give an overview and reasons for using dyes in certain preparations!

3. a). How to obtain fresh samples from the roots, stems, and leaves of plants in the free hand's section experiment?
 - b). Please correct some examples of poor stomata replicas based on the results of our discussion, and analyze the causes!

4. a). Explain how to obtain bone preparations by maceration (include the advantages and disadvantages of the technique used)!
 - b). What is the process of making spread preparations? Analyze the results of the preparations based on the material we have discussed!

5. a). Squash preparation is a method to determine the stages of cell division, both mitosis and meiosis. Give a brief description of the manufacturing process (starting from the preparation stage to reading the preparations) and analyze the shortcomings that can occur when making these preparations!
 - b). The structure and ornamentation of the pollen walls can be observed using the acetolysis method. Explain the relationship between the use of pelising agents and the existing process so that the pollen preparations can be observed!