



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/>

Biology Virtual Lab

Undergraduate Programme in Biology Education

Module Handbook

Module Name	Biology Virtual Lab															
Module level	Undergraduate Programme															
Course Code	KB1820545															
Abbreviation, if applicable	-															
Courses included in the module, if applicable	-															
Semester/Term	6 th / Third Year															
Module coordinator (s)	Dr. Baskoro Adi Prayitno, M.Pd.															
Lecturer (s)	Chandra Adi Prabowo, S.Pd., M.Pd.															
Language	Bahasa Indonesia (Indonesian Language)															
Classification within the curriculum	Compulsory /Elective															
Teaching format/class hours per week during the semester	Direct instruction/flipped classroom (blended learning)/ 2 credits per meeting per week or 2 x 50 minutes (equal to 1 hours and 40 minutes per week)															
Workload	<table><tr><th>Type</th><th>CSU</th><th>Face to Face</th><th>Structured Activities</th><th>Self-study</th></tr><tr><td>T/P</td><td>2</td><td>26.7h (0.88 ECTS)</td><td>32h (1.06 ECTS)</td><td>32h (1.06 ECTS)</td></tr><tr><td>Total</td><td>2</td><td colspan="3">90.7 h (3 ECTS)</td></tr></table>	Type	CSU	Face to Face	Structured Activities	Self-study	T/P	2	26.7h (0.88 ECTS)	32h (1.06 ECTS)	32h (1.06 ECTS)	Total	2	90.7 h (3 ECTS)		
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Total	2	90.7 h (3 ECTS)														
Credit Point	2 sks (3.24 ETCS)															
Requirements																



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Learning goals/competencies	CLO 1 Explain the basic principles and role of virtual labs to train students' science process skills in biology learning. (PLO 3) CLO 2 Designing a virtual lab capable of training science process skills in biological learning according to material characteristics. (PLO 3, PLO 5) CLO 3 Developing a virtual lab that can support effective and efficient virtual biology learning. (PLO 5) CLO 4 Evaluating the effectiveness and success of biological learning using virtual labs is reviewed from the achievement of aspects of students' science process skills. (PLO 3) CLO 5 Have knowledge of technology, information / data and be able to apply it in solving problems in their area of expertise												
Content:	This course is an elective course for study programs that discusses the study of: 1. Basic principles of virtual lab 2. Science process skills 3. Online inquiries 4. Virtual lab elements 5. Virtual lab activities 6. Evaluation of virtual lab-based learning												
Attribute Soft skill	1. Able to think conceptually, analytically, and logically 2. Have good communication skills												
Study/exam achievements	Students are required to attend the face-to-face lecture minimum 75% to be able to take the Mid and Final exam. It is considered to complete the course and pass if students 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>Task/quiz/presentation</td><td>30</td></tr><tr><td>Participation</td><td>10</td></tr><tr><td>Mid-Term Test</td><td>30</td></tr><tr><td>Final Exam</td><td>30</td></tr><tr><td>Final Score</td><td>100</td></tr></table>	Aspect	(%)	Task/quiz/presentation	30	Participation	10	Mid-Term Test	30	Final Exam	30	Final Score	100
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Learning Methods	Lecture, discussion, and workshop
Form of Media	Powerpoint slide, multimedia
Literature (primary references)	1. Stauffer et al. 2018. Labster Virtual Lab Experiments: Basic Biology. Springer Spektrum 2. Robinson, Tony. 2017. Building Virtual Machine Labs: A Hands-On Guide. CreateSpace Independent Publishing Platform 3. Siegel, Kevin. 2017. Articulate Storyline 3 & 360: The Essentials. IconLogic, Inc. 4. Abbie Brown, 2019. The Essentials of Instructional Design. Routledge 5. Rezba, Richard. 2011. Learning And Assessing Science Process Skills. Kendall/Hunt Publishing Company
Notes	Scheduled instruction in (a) a classroom or laboratory(50 minutes); (b) Structured activity (60 minutes); (c) an Individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**1 sks = 1.62 ECTS according to Rector Decree of Universitas Sebelas Maret No. 582/UN27/HK/2016

Assessment

Presence and Participation Rubric

	5	3	1
Presence	The number of attendance is 16 times = 100%	The number of attendance 13 to 15 times = 85%	The number of attendance is less than 13 times



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Participation	Asking relevant questions or responding accurately both in person and through online discussion forums > 8 times in 16 meetings	Asking relevant questions or responding accurately both in person and through online discussion forums 6 - 8 times in 16 meetings	Asking relevant questions or responding accurately both in person and through online discussion forums <5 times in 16 meetings
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Presentation Assessment Rubric

Dimension	Weight	Score	WxS	Comments
Mastery of the material	30%			
Accuracy solves problems	30%			
Communication skills	20%			
Ability to answer questions	10%			
Presentation completeness	10%			

DIMENSION	Scale				
	Very Good >85	Good 71-84	Sufficient 60-70	Deficient 40-59	Very Deficient <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.

MID Test



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1. The development of a virtual lab requires references related to the construction and content of the virtual lab to match the results generated from the virtual experiment in accordance with the empirical results of the original laboratory research.
Look for a journal article about virtual lab applications and tell how virtual labs are applied in learning according to the article!
2. Each subject has different characteristics that refer to how a field of science is discovered. This condition causes the type of virtual lab developed to be adjusted to these characteristics.
Explain the differences in the characteristics of science learning, especially biology with other subjects, causing the characteristics of the type of virtual lab used will also be different!
3. One type of skill that is trained in virtual labs is science process skills which are the basis for the development of the field of biology. However, not all types of science process skills can be applied in virtual labs.
What science process skills do you think it is possible to train students through the use of virtual labs? Why?
4. The basis of virtual lab development in the field of learning is the application of virtual inquiry-based learning. Describe the stages of inquiry-based learning that you know!
5. Explain why you chose the topic/KD (as per your choice) to be developed in the virtual lab development project!

MID Test Rubric

Question Number	Score		
	3	2	1
1	Students are able to identify relevant journal articles and analyze them appropriately.	Students are able to identify relevant journals but have not been able to analyze them appropriately.	Students identify related but less relevant journals



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2	Students are able to compare the characteristics between subjects and relate them to the virtual lab specifications needed.	Students are able to compare subject characteristics but are not yet able to relate to virtual lab specifications appropriately.	Students are able to explain the characteristics of biology learning but have not been able to compare it with the characteristics of other subjects.
3	Students are able to explain each type of science process skill and relate it to the virtual lab.	Students are able to explain each type of science process skill but have not been able to relate it to the specifications of the virtual lab.	Students are only able to explain some types of science process skills
4	Students are able to explain the stages of inquiry-based learning and compare the types of inquiry learning.	Students are able to explain the stages of inquiry learning but not yet able to explain the types.	Students are able to mention the stages of inquiry learning but have not been able to explain correctly
5	Students are able to explain the reasons for choosing KD appropriately as a reason for developing a virtual lab	Students are able to explain the reasons for choosing KD but are less precise as a reason for developing virtual labs	Students are able to choose KD but have not been able to explain why