

Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Master of Science Education Study Program

Document Code

SEMESTER LEARNING PLAN CODE **Credit Weight** Compilation Date Courses **Course Family** SEMESTER Learning Material Development 8410104194 T=3 P=0 ECTS=6.72 February 6, 2 (PBP) 2023 AUTHORIZATION SP Developer **Course Cluster Coordinator** Study Program Coordinator Dr. Eko Hariyono, S.Pd., M.Pd. Prof. Dr. Erman, M.Pd. dan Dr. Sifak Indana Dr. Sifak Indana, M.Pd. Learning Project Based Learning model PLO study program which is charged to the course Program Learning Program Objectives (PO) Outcomes (PLO) **PLO-PO** Matrix P.0 PO Matrix at the end of each learning stage (Sub-PO) P.0 Week 1 2 4 5 8 9 10 3 6 7 11 12 13 14 15 16 Description This course examines and provides students with a comprehensive understanding of the development of science learning materials that suit the characteristics of students and provides skills in developing teaching materials according to the student's field of study background. The study includes instructional design assumptions, learning principles and learning conditions, instructional design rationale and instructional system design. Included in this study are learning processes, learning targets, various learning protecting strategies, learning methods, learning media, developing evaluation instruments, learning resources. At the end of the lecture, an analysis of the learning materials that have been developed is carried out in the form of seminar results. Short Course Description have been developed is carried out in the form of seminar results References Main : 1. 1. Arends, R.I. (2012). Learning to teach. Boston: McGraw-Hill. 2. 2. Bell, R.I. (2008). Teaching the nature of science through process skill. New York: Allyn and Bacon. 3. 3. Bernstein, D. et al. (2006). Making teaching and learning visible: course portfolio and the peer review of teaching. San Francisco: Angker Publishing Company. 4 4. Cbism, N. (2007). Peer review of teaching: a sourcebook. Bolton, Massachusseetts: Angker Publishing Co. 5. 5. Erman et al. (2018). Scientific thinking skills: Why junior high school science teachers cannot use discovery and inquiry models in classroom. ICST, Atlantis Press. Supporters: Coference book of Educational of science, technology, engineering, and mathematics International Conference (ESTEMIC) 2021. 1. Bandung: UIN GJ. 2 Erman et al. (2018). Model Discovery. PPt Presentasi PKM Prodi S2/S3 Pendidikan Sains di Lombok. 3. Erman (2023). Project-based learning implementation in science class: Challenges for Indonesian educational system. Surabaya: Paper in Agreement implementation between Science Education Department Unesa and PG Chemistry Vykram University Ujjain Indoa 4 Erman (2021). STEM-based learning in science classes: Challenges for Indonesian educational system. Bandung ESTEMIC 2021 Wahyuni, Sanjaya, Erman, dan Jatmiko (2019). Edmodo-Based Blended Learning Model as an Alternative of Science Learning to 5. Motivate and Improve Junior High School Students' Scientific Critical Thinking Skills. Ijet, 14(7) Supporting Dr. Sifak Indana, M.Pd.

lecturer		M.Pd.					
Week-	Final abilities of each learning stage	Eval	uation	Lear Stude	elp Learning, ning methods, nt Assignments, <mark>stimated time]</mark>	Learning materials [References]	Assessment Weight (%)
	(Sub-PO)	Indicator	Criteria & Form	Offline(offline)	Online (<i>online</i>)	[Kelerences]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Explain the characteristics of models, approaches and learning methods	 1.1. Actively listen and record information and tasks, ask questions, and respond to information/tasks 2.2. Understand the information and learning tasks in LKM 	Criteria: Score 4 if you actively listen and record information and assignments, and ask and/or respond to information or assignments, score 3 if you actively listen and record information and assignments, but ask or respond to information or assignments, score 2 if you actively listen but do not record information and assignments delivered, and a score of 1 if you do not listen and record the information and assignments Form of Assessment : Participatory Activities	Presenting information, division of tasks, and questions and answers for 150 minutes		Material: Learning models References: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: The nature of science References: Bell, RI (2008). Teaching the nature of science through process skills. New York: Allyn and Bacon. Material: Teaching and learning References: Cbism, N. (2007). Peer review of teaching: a sourcebook. Bolton, Massachusetts: Armature Publishing Co.	0%
2	Explaining TCT models: Inquiry- based learning and discovery learning		Criteria: 1.Score 4 if the presentation is equipped with attractive PPt slides, presented explicitly, logically and clearly, and answers participants' questions precisely and in detail 2.Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. 3.Score 2 if the presentation is equipped with attractive PPt slides, is presented clearly but not explicitly and cannot answer participants' questions secuted clearly but not explicitly and cannot answer participants' questions accurately and in detail 4.Score 1 if the presentation is equipped with PPt but is presented in a way that is not clear and explicit. Score Form of Assessment : Portfolio Assessment		Presentation and discussion 150	Material: Learning models References: Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Inquiry and discovery learning models References: Erman et al. (2018). Scientific thinking skills: Why junior high school science teachers cannot use discovery and inquiry models in the classroom. ICST, Atlantis Press. Material: Discovery learning model References: Erman et al. (2018). Discovery Models. PPt Presentation of PKM Masters/S3 Science Education Study Program in Lombok.	10%

3	Explain cooperative and collaborative learning models	1. Describe the characteristics of cooperative learning and collaborative learning models	Criteria: 1. Score 4 if the presentation is equipped with attractive PPt slides, presented explicitly, logically and clearly, and answers participants' questions precisely and in detail 2. Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. 3. Score 2 if the presentation is equipped with attractive PPt slides, is presented clearly but not explicitly and cannot answere participants' questions accurately and in detail 4. Score 'if the presented in a way that is not clear and explicit Form of Assessment : Practice / Performance	Presentation and discussion 150 minutes	Material: Learning models References: Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Collaborative learning Reference: Erman (2021). STEM-based learning in science educational classes: Challenges for Indonesian system. Bandung ESTEMIC 2021	0%
4		 1.1. Describe the characteristics of project-based learning and problem-based learning models 2.2. Analyze the curriculum for implementing project-based learning and problem-based learning models 	 Practice / Penomatice Criteria: Score 4 if the presentation is equipped with attractive PPt slides, presented explicitly, logically and clearly, and answers participants' questions precisely and in detail Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. Score 2 if the presentation is equipped with attractive PPt slides, is presented lexplicitly and logically, but has not answered the participants' questions precisely and in detail. Score 2 if the presentation is equipped with attractive PPt slides, is presented clearly but not explicitly and cannot answer participants' questions accurately and in detail Score 1 if the presented unclearly and explicitly Form of Assessment : Practice / Performance	Presentation and discussion 150	Material: Learning models References: Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Project-based learning Reference: Erman (2023). Project-based learning implementation in science class: Challenges for Indonesian educational system. Surabaya: Paper in Agreement implementation between Science Education Department Unesa and PG Chemistry Vykram University Ujjain Indoa	0%

5	Explains learning approaches: STEAM and Blended learning.	 Describe the characteristics of the project- based learning model Describe the characteristics of the problem- based learning model 	Criteria: 1.Score 4 if the presentation is equipped with attractive PPt slides, presented explicitly, logically and clearly, and answers participants' questions precisely and in detail 2.Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. 3.Score 2 if the presentation is equipped with attractive PPt slides, is presented clearly but not explicitly and cannot answer participants' questions accurately and in detail 4.Score 1 if the presentation is equipped with PPt but is presented unclearly and explicitly Form of Assessment : Practice / Performance		Presentation and discussion 150	Material: STEAM Reader: Erman (2021). STEM- based learning in science educational classes: Challenges for Indonesian system. Bandung ESTEMIC 2021 Material: Blended learning References: Wahyuni, Sanjaya, Erman, and Jatmiko (2019). Edmodo-Based Blended Learning Model as an Alternative to Science Learning to Motivate and Improve Junior High School Students' Scientific Critical Thinking Skills. Ijet, 14(7) Material: STEM Library: Conference book of Educational of science, technology, engineering, and mathematics International Conference (ESTEMIC) 2021. Bandung: UIN	10%
6	Prepare a project plan for developing teaching materials/textbooks	Designing teaching material/textbook development projects	Criteria: 1.Score 4 if the proposal is prepared completely according to the format, realistic and logical, and equipped with a team, schedule and costs. 2.Score 3 if the proposal is prepared completely according to the format, realistic and logical, equipped with a team, but the schedule and costs are less realistic 3.Score 2 if the proposal is prepared according to the format, but is less realistic and logical, and is equipped with a team, schedule and costs Form of Assessment : Project Results Assessment / Product Assessment	150 minute workshop		GJ. Material: Learning models References: Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: STEM/STEAM, Collaborative learning Library: Conference book of Educational of science, technology, engineering, and mathematics International Conference (ESTEMIC) 2021. Bandung: UIN GJ.	20%

7	Presenting the project design for developing teaching materials: teaching materials/textbooks	Explain the design of the teaching material development project according to the model and approach developed.	Criteria: 1. Score 4 if the presentation is equipped with attractive PPt slides, presented explicitly, logically and clearly, and answers participants' questions precisely and in detail 2. Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. 3. Score 2 if the presentation is equipped with attractive PPt slides, is presented clearly but not explicitly and cannot answere participants' questions accurately and in detail 4. Score 1 if the presentation is equipped with PPt but is presented unclearly and explicitly Form of Assessment : Project Results	Presentation and question and answer 150 minutes	Material: Learning models References: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: The nature of science References: 2. Bell, RI (2008). Teaching the nature of science through process skills. New York: Allyn and Bacon. Material: STEAM/STEM Library: 1. Conference book of Educational of science, technology, engineering, and mathematics International Conference (ESTEMIC) 2021. Bandung: UIN GJ.	20%
8	 Explaining TCT models: Inquiry- based learning and discovery learning Explain cooperative and collaborative learning models Explain project- based learning and problem- based learning models Explains STEAM/STEM and Blended learning approaches 	1. 2.Explains learning models and their implementation in science learning	Assessment / Product Assessment Criteria: 1.Score 4 if you can explain in detail and precisely the purpose of each learning model/approach, supporting theory, implementation of the model in science learning, and factors that influence the effectiveness of implementing the learning model/approach 2.Score 3 if you can explain the purpose of each learning model/approach, supporting theory, implementation of the model in science learning, but cannot explain in detail the factors that influence the effectiveness of implementing the learning model/approach 3.Score 2 if you can explain correctly but not in detail about the purpose of each learning model/approach 3.Score 2 if you can explain correctly but not in detail about the purpose of each learning model/approach 3.supporting theory, implementation of the model in science learning model/approach, supporting theory, implementation of the model in science learning, and factors that	Midterm 100 minutes	Material: Learning models References: Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Inquiry and discovery learning References: Erman et al. (2018). Scientific thinking skills: Why junior high school science teachers cannot use discovery and inquiry models in the classroom. ICST, Atlantis Press. Material: Project based learning and problem based learning and problem based learning implementation in science class: Challenges for Indonesian educational system. Surabaya:	0%

	influence the effectiveness of implementing the learning model/approach 4.Score 1 if there is a lack of detail and some are inaccurate in explaining the purpose of each learning model/approach, supporting theory, implementation of the model in science learning, and factors that influence the effectiveness of implementing the learning model/approach	Paper in Agreement implementation between Science Education Department Unesa and PG Chemistry Vykram University Ujjain Indoa Material: STEM/STEAM Reference: Erman (2021). STEM-based learning in science educational classes: Challenges for Indonesian system. Bandung ESTEMIC 2021 Material: Blended learning References: Wahyuni, Sanjaya, Erman, and Jatmiko (2019). Edmodo-Based Blended Learning Model as an Alternative to Science Learning to Motivate and Improve Junior High School Students' Scientfic Critical Thinking Skills. ljet, 14(7)
--	--	--

9	1.Developing	Criteria:		Material:	0%
	textbooks	1.Score 4 if the	Project: 150 minute	Learning	
	2.Developing	textbook is in	textbook development	models References: 1.	
	learning tools	accordance with		Arends, RI	
		the format, has		(2012).	
		novelty, is		Learning to	
		coherent, has a		teach. Boston:	
		logical study, is presented		McGraw-Hill.	
		explicitly, and is appropriate to the		Material: The	
		topic and is		nature of	
		equipped with		science	
		learning tools,		References: 2.	
		published with		Bell, RI (2008). Teaching the	
		ISBN and IPR		nature of	
		certified		science	
		2.Score 3 if the		through	
		textbook matches		process skills.	
		the format, has		New York:	
		novelty, is		Allyn and	
		interesting, the		Bacon.	
		study is logical,		Motorial	
		and according to		Material: Inquiry and	
		the topic, the		discovery	
		presentation is		model	
		explicit, less		References: 5.	
		coherent, and is		Erman et al.	
		equipped with learning tools, but		(2018).	
		has not been		Scientific	
		published and is		thinking skills: Why junior high	
		IPR certified		school science	
		3.Score 2 if the		teachers	
		textbook is in		cannot use	
		accordance with		discovery and	
		the format, has		inquiry models	
		novelty, is		in the	
		coherent, logical		classroom.	
		study, and is on		ICST, Atlantis Press.	
		topic but lacks		F1635.	
		explicit exposure,		Material:	
		and is not		Project-based	
		equipped with		learning	
		learning tools, is not published and		References: 3.	
		is not certified		Erman (2023).	
		io not ocranou		Project-based	
		Form of Assessment :		learning implementation	
		Project Results		in science	
		Assessment / Product		class:	
		Assessment		Challenges for	
				Indonesian	
				educational	
				system. Surabaya:	
				Surabaya: Paper in	
				Agreement	
				implementation	
				between	
				Science	
				Education	
				Department Unesa and PG	
				Chemistry	
				Vykram	
				University	
				Ujjain Indoa	
				Material:	
				STEAM	
				References: 4.	
				Erman (2021). STEM-based	
				learning in	
				science	
				educational	
				classes:	
				Challenges for	
				Indonesian	
				system. Bandung	
				ESTEMIC 2021	

10 Implementation of the costopion materials in extraords. Criteria: Tackropy the the costopion in extraords. Tackropy the costopion in extraords. Original interval in	r	,		1			
 testmokes 2.Developing learning tools 2.Developing learning tools 2.Developing learning tools 2.Developing learning tools 2.Developing learning tools 2.Developing learning tools 3.Score 4 if the testmoke and explicitly, and is equipped with learning tools, but notefly, is interesting, the subsystem tools 2.Score 3 if the testbook matches the format, has novelly, is interesting, the subsystem tools, but novelly, is intools, conforms to the form of Assessment : Project Results 	10		1.Developing	Criteria:			0%
 Laberting encloses 2-Developing learning tools tearning tools 		projects developing		1.Score 4 if the			
for cooperative mean featuring tools decordance with the format, has coldaborative decordance with the decordance with t		teaching	2.Developing	textbook is in	150 minutes	models	
ieaming and collaborative learning models have been been been been been been been be		for cooperative		accordance with		References: 1.	
collaborative novely, is [2012]. cohrent, has a logical study, is Learning to models [2012]. indext, Baban Match, Baban appropriate to the topic and is material: The appropriate to the topic and is material: The material: The material: The appropriate to the topic and is material: The material: The m		learning and	······	the format. has			
learning models coherent, has a bogical study, is presented explicitly, and is appropriate to the appropriate to the topic and is equipped with learning tools, published with Start References: 2. Berling tools, published with Start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References: 2. Score 31 the topic and is explicitly, is interesting, the start References the format, has novelly, is coherent, and is coherent, and is explicitly, is coherent, logical start, and is on topic but lacks explicit exposure, and is not explicitly is not appropriate to the topic, the topic and is explicitly, is incoherent, the start is is centified		collaborative					
leaden boston: presented explicitly, and is appropriate to the topic and is equipped with learning tools, published with ISBN and IPR certified 2.Score 3 if the terstook matches the format, has more control of the study is legical and according to the topic, the presentation is explicit, tess coherent, and is equipped with learning cols, the format, has more control of the study is legical and according to the topic, the presentation is explicit, tess coherent, and is coherent, and		learning models					
prisemented Indicator function explicitly, and is Matchina appropriate to the tabler of equipped with References: 2 learning tools, Bell, R (2008), published with Teaching the table and is science certified Science 2.Score 3 the through the textbook matches process stills, the topic, the through the and according to Teaching and explicitly, less Allyn and and according to Teaching and explicitly, less Cbian, NA complexities Cbian, NA <td></td> <td></td> <td></td> <td>,</td> <td></td> <td></td> <td></td>				,			
is opticity, and is appropriate to the topic, and is equipped with equipped with equipped with entering tools, published with Teaching the nature of certified cerified certified certified certified certified certified c						McGraw-Hill.	
appropriate to the matteria: The matteria: The experiment to the equipped with equipped with equipped with to the format, has no verified science for the the format, has no verify, is a constrained science of the experiment of the format, has no verify, is constrained and is not equipped with the format, has no verify, is not published and is not equipped with the format, has no novely, is not published and is not equipped with the format, has no verify, is not published and is not equipped with the format, has no verify, is not published and is not equipped with the format, has no verify, is not published and is not equipped with the format, has no verify, is not published and is not exertified science. 4. Chism, N. Science 3. Score 2 if the Massature of science and is not entitle and is not exertified science. 4. Score 1 if the textbook is in not published and is not entitle and is not published and is is not entitle and is not entitle and is not published and is is not published and is is not entitle and is not published and is not entitle to the format, has no novely, is not appropriate to the topic, the scutts is not published and is not entitle to the format, has no novely, is not appropriate to the topic, has segnific texposure, and is not published an						p	
Image: construction of the image of the						Material: The	
equipped with Before mees: 2. learning tools, Bell, R1(2006) published with Teaching their 1SBN and IPR nature of certified science 2.5core 31 the through textbook matches process skills, novelly, is Allyn and and according to Material: textbook matches process skills, novelly, is Allyn and ada cacording to Material: the topic, the Bacon. explicit, less Coherent, and is explicit, less Coherent, and is equipped with (2007). Peer releave of teaching: a about on the format, has Amature Published and is Bouton iPR certified Massachusetts: 3.5core 21 the Armature abouton on accordance with the format, has on overby, is coherent, logical and is not abouton on accordance abouton on accordance with the format, has on overby, is coherent, format accordance is not centified science 4.5core 21 the armature						nature of	
learning tools, published with ISBN and IPR certified 2.Score 3t the textbook matches the format, has novelty, is and according to study is logical, and according to the toric, the presentation is explicit, less coherent, and is coherent, and is ond equipped with learning tools, is not published and is not certified Form of Assessment : Project Results Assessment / Product						science	
published with Teaching the Tacking the Taken of certified Science I through Traces skills. 2. Score 3 if the traces process skills. New York: Allyn and Allyn and Bacon. and according to The teaching and Learning Allerences: 4. Allyn and Allyn and Bacon. study is logical, and according to The teaching and Learning Allerences: 4. coherent, and is Chism, M. couplich, less Chism, M. couplich, less Chism, M. couplich, less Chism, M. couplich, chism, M. couplich, less Chism, M. couplich, chism, M. couplished and is Bolton, the format, has not been published and is not coupling to couplich tacks. explicit exposure, and is not topic but shas explicit exposure, and is not overly, is is not certified Situdy is not appropriate to the topic, tacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product						References: 2.	
iSBN and IPR nature of a science certified science 2.Score 3 if the through textbook matches through the format, has New York: novelty, is Allyn and and according to Material: teressing, the Bacon. and according to Material: teressing, the Bacon. and according to Teaching and explicit, less Chism, N. coherent, and is Chism, N. equipped with review of learning tools, but teaching: a has not been Sourcebook. published and is Boton. iffe certified Massachusetts: 3.Score 2 if the Armature of textbook is in Publishing Co. accordance with the format, has novelty, is coherent, logical study, and is on tool control topic but tacks explicit exposure, and is not explicit explicated explicit explicated is novelty, is in orupublished, and<						Bell, RI (2008).	
certified science 2.S.Sore 3 if the through textbook matches process skills. textbook matches process skills. nowelby, is Allyn and and according to Teaching and explicit, less Chism, M. coherent, and is (2007). Peer equipped with review of learning tools, but teaching: a accordance with review of learning tools, is in accordance with novely, is Score 2 if the accordance with review of textbook is in accordance with accordance with Publishing Co. the textbook is in accordance with accordance with equipped with learning tools, is novely, is coherent, logical study, and is on totdy, is not published and is not equipped with learning tools, is not published and is not out out, is not published and is not out out, is not published, and is not notwely, is not published, and is not noty, is not published, and is not noty, is not published, and is not not published, and is not out published, and is not						Teaching the	
2.Score 3 if the process skills. the format, has New York: novely, is Aljn and interesting, the Bacon. and according to Material: and according to Teaching and presentation is Performance: explicit, less Chism, N. coherent, and is Bolton, N. iPR certified Masachusetts: amacrostance with treaching: a accordance with the format, has novely, is coherent, logical accordance with Publishing Co. accherent, logical Sourcebook billing and is on topic but leaks explicit exposure, and is not quipped with Publishing Co. accordance with the format, has novely, is in ot Willie is not certified 4.Score 1 if the textbook, so nor in on ovely, is in ot quipped with is not entified is not entified is not original is not quipped with is entified Project Results <td></td> <td></td> <td></td> <td></td> <td></td> <td>nature of</td> <td></td>						nature of	
itextbook matches process skills. hite format, has New York: novely, is Allyn and interesting, he Bacon. study is logical, Material: and according to Material: the topic, he Teaching and presentation is References: 4. coherent, and is (2007). Peer explicit, less Cbism, M. coherent, and is (2007). Peer published and is Bolton, published and is Bolton, iPR certified Massachusetts: 3.Score 2 if the Armature textbook is in Publishing Co. accordance with equiped with is not certified Massachusetts: 3.Score 2 if the Armature explicit exposure, and is not and is not equipped with learning tools, is not published and is not certified Massachusetts: 4.Score 1 if the the format, has novely, is not published and is not certified accordance with explicit exposure, and is not out bublished and is not certified 4.Score 1 if the the format, has <t< td=""><td></td><td></td><td></td><td></td><td></td><td>science</td><td></td></t<>						science	
Image: second				2.Score 3 if the		through	
Allyn and interesting, the study is logical, and according to the topic, the presentation is explicit, less coherent, and is equipped with learning tools, but teaching and learning explicit, less Coherent, and is equipped with learning tools, but teaching, a sourcebook. Bolion, IPR certified 3.Score 2 if the textbook is in accordance with the format, has not pellisted and is not equipped with learning tools, is not published and is not ertified 4.Score 1 if the textbook conforms to the format, has no novelly, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				textbook matches			
Allyn and interesting, the study is logical, and according to the topic, the presentation is explicit, less coherent, and is equipped with learning tools, but thas not been published and is iPR certified been sourcebook. Bolton Bo				the format, has		New York:	
interesting, the Bacon. study is logical, and according to the topic, the presentation is Material: Teaching and learning tools, but review of equipped with explicit, less Cobism, N. coherent, and is (2007). Peer equipped with learning tools, but teaching: a sourcebook. published and is Bolton. IPR certified Massachusetts: accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no no xelty, is is not certified 4.Score 2 if the equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no no xelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment : Project Results							
study is logical, and according to the topic, the presentation is explicit, less coherent, and is equipped with learning tools, but reaching: a coherent, and is equipped with iPR certified 3. Score 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is no novelty, is incoherent, the study, is incoherent, the study, is incoherent, the study, is incoherent, the study is not equipped with learning tools, is not published and is not certified 4. Score 1 if the study is not appropriate to the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified 5. Study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product						Bacon.	
and according to Material: the topic, the Teaching and presentation is References: 4. explicit, less Cbism, N. coherent, and is (2007) Peer equipped with review of learning tools, but teaching: and has not been sourcebook published and is Bolton, IPR certified Massachusetts: Armature textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is nor published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study, snot is on topic, lacks explicit exploit exposure, and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exploid, explicit exploid, is ont appropriate to the topic, lacks explicit exploid, is <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
Image: Section of the topic, the second of the topic, the presentation is explicit. Less Teaching and learning topic top						Material:	
Image: Second				0			
Image: standard is content, and is content, logical study, and is on topic but tacks explicit exposure, and is not certified Reference: 4. Chism, M. (2007). Peer review of teaching: a sourcebook. Bolton, uPR certified 3.Score 2: If the Armature textbook is in accordance with the format, has not certified study, and is on topic but tacks explicit exposure, and is not certified Armature 4. Score 1: The tacks is in accordance with the format, has not equipped with tearning tools, is not published and is not certified A.Score 1: The tacks texplicit exposure, and is not certified 4.Score 1: If the textbook is in content, he study is not appropriate to the topic, lacks explicit exposure, and is not certified Form of Assessment : Project Results							
coherent, and is CDSm, N. equipped with review of learning tools, but teaching; a has not been sourcebook. published and is Bolton, IPR certified Massachusetts: 3.Score 2 if the Armature textbook is in Publishing Co. accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks exployed with learning tools, is not published and is not equipped with learning tools, is not published and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not equipped with learning tools, is in ot equipped with							
equipped with (2007). Feel learning tools, but review of has not been sourcebook. published and is Bolton, IPR certified Massachusetts: 3.Score 2 if the Armature textbook is in Publishing Co. accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is no velty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is no velty, is not published and is not curfied 4.Score 1 if the textbook conforms to the tomat, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not equipped with learning tools, is not explored. not equipped with learning tools, is not equipped with learning tools, is not equipped with learning tools, is not equipped with						Cbism, N.	
equipped with review of learning tools, but teaching: a has not been sourcebook. published and is Bolton, IPR certified Massachusetts: 3.Score 2 if the Armature textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is no novelty, is no novelty, is not equipped with learning tools, is not equipped with learning tools, is no novelty, is no novelty, is not equipped with learning tools, is not equipped with learning tools, is not equipped with learning tools, is not equipped with <t< td=""><td></td><td></td><td></td><td></td><td></td><td>(2007). Peer</td><td></td></t<>						(2007). Peer	
learning tools, but has not been published and is IPR certified 3.5core 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.5core 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified							
has not been published and is IPR certified 3.Score 2 if the textbook is in accordance with the format, has novely, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no no novely, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, as in not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novely, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified				u ,			
published and is Bolton, IPR certified Armature 3.Score 2 if the Armature textbook is in Publishing Co. accordance with the format, has novelty, is coherent, logical study, and is on topical and is not explicit exposure, and is not equipped with learning tools, is notely, is incoherent, the study on the format, has novelty, is incoherent, the study is not apportate to the topic, lacks explicit exposure, and is not incoherent, the study is not apportate to the topic, lacks explicit explored with learning tools, is incoherent, the study is not appropriate to the topic, lacks explicit explored with learning tools, is not equipped with learning tools, is not equipped with learning tools, is not equipped with learning tools, and is certified Form of Assessment : Project Results Assessment / Product				has not been			
IPR certified Massachusetts: Armature 3.Score 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified Hereing tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				published and is			
Image: set of the set of				IPR certified			
textbook is in Publishing Co. accordance with the format, has novelly, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lack sexplicit exposure, and is not equipped with learning tools, is not published, and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product Product				3.Score 2 if the			
accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				textbook is in			
the format, has novelly, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has nonovelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				accordance with		J	
novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified							
coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified							
study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not published, and is certified Form of Assessment : Project Results Assessment / Product							
topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Asseessment / Product							
explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit explored with learning tools, is not published, and is certified Form of Assessment : Project Results Asseessment / Product							
and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				u ,			
4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
Image: state stat							
to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product				to the format, has			
study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product							
not published, and is certified Form of Assessment : Project Results Assessment / Product							
is certified Form of Assessment : Project Results Assessment / Product				not publiched and			
Form of Assessment : Project Results Assessment / Product							
Project Results Assessment / Product				is certified			
Project Results Assessment / Product							
Assessment / Product							
I ACCOCCIMONI							
Assessment				Assessment			

11 Implementation of projects for developing teaching materials/textbooks 1. Developing textbooks Criteria: Teaching materials Material: 0% 2. Develop 1. Score 4 if the textbook is in accordance with the format, has a novelty, is coherent, has a logical study, is presented explicitly, and is appropriate to the topic and is equipped with learning tools, published with 0% Material: 0%
published with ISBN and IPR certifiedReferences: 3.ISBN and IPR certifiedErman (2023).2.Score 3 if the textbook is in accordance with the format, has novelty, is interesting, the study is logical, and according to the topic, the persentation is explicit, less coherent, and is equipped with learning tools, but has not been published and is certified H3.Score 2 if the textbook is inUniversity University

	rr		· · ·			
12	Implementation of	1.Developing	Criteria:		Material:	0%
	projects to develop	textbooks	1.Score 4 if the	150 minute textbook	Learning	
	teaching materials/textbooks	2.Develop	textbook matches	development project	models	
	for STEM/STEAM	learning tools	the format, has		References: 1.	
	and blended	icanning tools	novelty, is		Arends, RI	
	learning		coherent, has a		(2012).	
	approaches		,		Learning to	
			logical study, is		teach. Boston:	
			presented		McGraw-Hill.	
			explicitly, and fits			
			the topic and is		Material:	
			equipped with			
			learning tools,		STEAM	
			published with		References: 4.	
			ISBN and HK		Erman (2021).	
			certified		STEM-based	
					learning in	
			2.Score 3 if the		science	
			textbook matches		educational	
			the format, has		classes:	
			novelty, is		Challenges for	
			interesting, the		Indonesian	
			study is logical,		system.	
			and according to		Bandung	
1			the topic, the		ESTEMIC 2021	
1			presentation is			
1			explicit, less		Material:	
1					Blended	
1			coherent, and is		learning	
1			equipped with		References:	
1			learning tools, but		Wahyuni,	
1			has not been		Sanjaya,	
1			published and is		Erman, and	
			IPR certified		Jatmiko (2019).	
			3.Score 2 if the		Edmodo-Based	
			textbook is in		Blended	
			accordance with			
			the format, has		Learning Model	
					as an	
			novelty, is		Alternative to	
			coherent, has a		Science	
			logical study, and		Learning to	
			is on topic but		Motivate and	
			lacks explicit		Improve Junior	
			exposure, and is		High School	
			not equipped with		Students'	
			learning tools, is		Scientific	
			not published and		Critical	
			is IPR-certified		Thinking Skills.	
			4.Score 1 if the		ljet, 14(7)	
			textbook conforms			
			to the format, has			
			no novelty, is			
			incoherent, the			
			study is not			
			appropriate to the			
			topic, lacks explicit			
			exposure, and is			
			not equipped with			
			learning tools, is			
			not published, and			
			is certified			
			Form of Assessment :			
			Project Results			
			Assessment / Product			
1			Assessment			
L	1					

r				- <u> </u>	
	1. Developing textbooks 2. Develop learning tools	Criteria: 1. Score 4 if the textbook matches the format, has novelty, is coherent, has a logical study, is presented explicitly, and fits the topic and is equipped with learning tools, published with ISBN and HK certified 2. Score 3 if the textbook matches the format, has novelty, is interesting, the study is logical, and according to the topic, the presentation is explicit, less coherent, and is equipped with learning tools, but has not been published and is IPR certified 3. Score 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is not certified Form of Assessment : Project Results Assessment / Product Assessment	Teaching materials project: Product revision 150	Material: Learning models References: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Discovery learning model References: Erman et al. (2018). Discovery Models. PPt Presentation of PKM Masters/S3 Science Education Study Program in Lombok. Material: Inquiry model References: Erman et al. (2018). Scientific thinking skills: Why junior high school science teachers cannot use discovery and inquiry models in the classroom. ICST, Atlantis Press.	20%

	·					
14	Implementation of projects to develop teaching materials/textbooks for inquiry-based learning and discovery learning models	1.Developing textbooks 2.Develop learning tools	Criteria: 1.Score 4 if the textbook is in accordance with the format, has novelty, is coherent, has a logical study, is presented explicitly, and is appropriate to the topic and is equipped with learning tools, published with ISBN and IPR certified 2.Score 3 if the presentation is equipped with attractive PPt slides, presented explicitly and logically, but has not answered the participants' questions precisely and in detail. 3.Score 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4.Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results	Textbook project: Product revision 150	Material: Learning modelsReferences: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill.Material: The nature of scienceReferences: 2. Bell, RI (2008). Teaching the nature of science through process skills. New York: Allyn and Bacon.Material: STEAM References: 4. Erman (2021). STEM-based learning in science educational classes: Challenges for Indonesian system. Bandung ESTEMIC 2021	0%
			Project Results Assessment / Product Assessment			

15	Implementation of projects to develop teaching materials/textbooks for inquiry-based learning and discovery learning models	1.Developing textbooks 2.Develop learning tools	Criteria: 1. Score 4 if the textbook is in accordance with the format, has novelty, is coherent, has a logical study, is presented explicitly, and is appropriate to the topic and is equipped with learning tools, published with ISBN and IPR certified 2. Score 3 if the textbook matches the format, has novelty, is interesting, the study is logical, and according to the topic, the presentation is explicit, less coherent, and is equipped with learning tools, but has not been published and is IPR certified 3. Score 2 if the textbook is in accordance with the format, has novelty, is coherent, logical study, and is on topic but lacks explicit exposure, and is not equipped with learning tools, is not published and is not certified 4. Score 1 if the textbook conforms to the format, has no novelty, is incoherent, the study is not appropriate to the topic, lacks explicit exposure, and is not equipped with learning tools, is not published, and is not equipped with learning tools, is not published, and is certified Form of Assessment : Project Results Assessment / Product Assessment		Project and product presentation: Finalization 150 minutes	Material: Learning models References: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill.	45%
16		1.Developing textbooks 2.Develop learning tools	Criteria: 1.Score 4 if the textbook is in accordance with the format, has novelty, is coherent, has a logical study, is presented explicitly, and is appropriate to the topic and is equipped with learning tools, published with ISBN and IPR certified 2.Score 3 if the textbook matches the format, has novelty, is interesting, the study is logical, and according to	Final semester exam (UAS) 100 minutes		Material: Learning models References: 1. Arends, RI (2012). Learning to teach. Boston: McGraw-Hill. Material: Inquiry and discovery learning model References: 5. Erman et al. (2018). Scientific thinking skills: Why junior high school science teachers cannot use discovery and inquiry models in the	30%

Evaluation Percentage Recap: Project Based Learning

Lvu	Evaluation reformage recoup. Project Dased Learning					
No	Evaluation	Percentage				
1.	Project Results Assessment / Product Assessment	135%				
2.	Portfolio Assessment	10%				
3.	Practice / Performance	10%				
		100%				

Notes 1. Learning Outcomes of Study Program Graduates (PLO - Study Program) are the abilities possessed by each Study Program are the abilities possessed by each Study Program Graduates (PLO - Study Program) are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.

The PLO imposed on courses are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge. 2.

- 3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
- 4. Subject Sub-PO (Sub-PO) is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
- 5. Indicators for assessing abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
- 6. Assessment Criteria are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
- 7. Forms of assessment: test and non-test.
- 8. Forms of learning: Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
- 9. Learning Methods: Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
- 10. Learning materials are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 11. The assessment weight is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
- 12. TM=Face to face, PT=Structured assignments, BM=Independent study.