PORTOFOLIO
STUDY OF SCIENCE I
ACADEMIC YEAR 2019/2020 ODD SEMESTER



Course Coordinator:
Prof. Dr. Hj. Rudiana Agustini, M.Pd.

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MASTER PROGRAM OF SCIENCE EDUCATION
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS NEGERI SURABAYA

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A. SEMESTER LEARNING ACTIYITY PLAN

A.1. COURSE IDETITY

Master Program of Science Education Module Handbook

Module Name :	*Kajian Sains 1/* Study of Science I*)
Module level :	Master Program of Science Education
Course Code :	8410102206
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	2nd /First Year
Module coordinator(s)	Prof. Dr. Hj. Rudiana Agustini, M.Pd.
Lecturer(s):	Prof. Dr. Hj. Rudiana Agustini, M.Pd.
Language:	Indonesian Language
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	2 contact hours of lectures (Indonesia credit semester or CU*)
Workload :	2 x 50 minutes lectures, 2 x 90 minutes structured activity, 2 x 100 minutes individual activity, 14 weeks per semester, 112 total hours per semester ~ 4.48 ECTS**
Credit Point:	2 CU (4.48 ECTS)
Requirements:	
Learning goals/competencies:	1. Develop knowledge of energy source materials in life including biological systems,processes that generate and use energy (including photosynthesis), transport and conversion energy in biological systems and everyday life. 2. Solving problems of energy availability and needs, forming awareness and energy-saving attitudes through an interdisciplinary approach in the form of science learning design. 3. Manage research / study activities to solve energy availability problems using various sources of information, physical sciences, chemistry, biology, and relevant technology.
Content	This course examines the concept of energy and its role in everyday living systems including biological systems, forms of energy and their changes, photosynthesis (photosystem 1, photosystem 2, phosphorylation and fixation of carbon), energy conversion pathways (oxidation, glycolysis, Krebs cycle, and respiration chain).
Attribute Soft skill:	Scientific report, public speaking, and team work

<table>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 70. Final score is calculated as follows: 20% Participation + 30% Assignment + 20% Midterm Exam (Midterm Exam (ME)) + 30% Final Exam (FE))
Table index of graduation:
<table>
<tr><th>Interval Score</th><th>Index</th></tr>
<tr><td>0 - 39,999</td><td>E</td></tr>
<tr><td>40 - 54,999</td><td>D</td></tr>
<tr><td>55 - 59,999</td><td>C</td></tr>
<tr><td>60 - 64,999</td><td>C+</td></tr>
<tr><td>65 - 69,999</td><td>B-</td></tr>
<tr><td>70 - 74,999</td><td>B</td></tr>
<tr><td>75 - 79,999</td><td>B+</td></tr>
<tr><td>80 – 84,999</td><td>A-</td></tr>
<tr><td>85 – 100</td><td>A</td></tr>
</table></td></tr>
<tr><td>Learning Methods :</td><td>Case Method and Discussion</td></tr>
<tr><td>Form of Media:</td><td>Power Point slides, e-book file, and multimedia.</td></tr>
<tr><td>Literature (primary references):</td><td>1. Appling, D.R., Anthony Cahill, S.J., Mathew, C.K. (2016). Biochemistry: Concepts and Connections. Pearson
2. Pattabhi, V. And Ghautam, N. (2002). Biophysics. NewDelhi, Kluwer Academic Publisher.
3. Waigh, T. (2007). Applied Biophysics. Willey</td></tr>
<tr><td rowspan="3">Notes:</td><td>*1 CU in learning process = three periods consist of: (a) scheduled instruction in a classroom (50 minutes); (b) structured activity (90 minutes); and (c) individual activity (100 minutes) according to according to Rector Decree of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2020</td></tr>
<tr><td>**1 CU = 2.24 ECTS according to Rector Decree of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2020</td></tr>
<tr><td>*Total ECTS = (total hours workload/ 60 min) / 25 hours
Each ECTS is equals with 25 hours</td></tr>
<tr><td>Last Amendment</td><td>5 January 2023</td></tr>
</table>

A.2. COURSE DESCRIPTION

This course examines the concept of energy and its role in everyday living systems including biological systems, forms of energy and their changes, photosynthesis (photosystem 1, photosystem 2, phosphorylation and fixation of carbon), energy conversion pathways (oxidation, glycolysis, Krebs cycle, and respiration chain).

A.3. LESSON PLAN

UNESA	**Postgraduate-Surabaya State University of Science Education Study Program**	**Document Code**

LESSON PLAN				
Courses (MK)	**MK code**	**Weight (credits)**	**Smtr/Academic Year**	**Compilation Date**
IPA Study 1	8410102206	2	Even /2022-2023	

RPS Developer	**Coordinator**	**Head of Study Program**
Prof. Dr. Hj. Rudiana Agustini, M.Pd.	Prof. Dr. Hj. Rudiana Agustini, M.Pd.	Dr. Eko Hariyono , M.Pd. _

Learning Achievement (CP)	**PLO- Study Program Charged To Course**	
	PLO-2	Develop knowledge and technology in the fields of physics, chemistry, biology and natural sciences supported by the latest IT.
	PLO-9	Design a conducive science learning environment to carry out active learning activities and reflect on their effectiveness.
	Course Learning Outcomes (CLO)	
	CLO1	Develop knowledge about ingredients source energy in life including system biology , the processes that produce and use energy (incl photosynthesis), transport and conversion energy in system biology and life everyday .
	CLO2	Solve problem availability and needs energy , formation awareness and attitude economical energy through approach interdisciplinary in form design science learning .
	CLO3	Manage activity research / studies For solve problem availability energy use various source information , knowledge relevant physics , chemistry , biology , and technology .
	Final ability of each learning stage (Sub-CLO)	
	Sub-CLO1	Communicating concepts related to the characteristics of living things, developing these concepts and using these concepts to explain events in everyday life.
	Sub-CLO2	Present concepts related to ecosystems, develop these concepts and use the concepts to explain events in everyday life
	Sub-CLO3	Communicating concepts related to survival, developing these concepts and using the concepts to explain events in everyday life
	Sub-CLO4	Communicating concepts related to the structure and function of plant organs, developing these concepts and using the concepts to explain events in everyday life

	Sub-CLO5	presenting right related concepts _ response plant , develop concepts tbs and use draft For explain incident in life everyday .
	Sub-CLO6	Communicate concepts related to photosynthesis, develop these concepts and use the concepts to describe events in everyday life.
	Sub-CLO7	Communicating concepts related to locomotion, developing these concepts and using the concepts to explain events in everyday life.
	Sub-CLO8	Communicate concepts related to the digestive system, develop these concepts and use the concepts to explain events in everyday life
	Sub-CLO9	Communicate concepts related to the respiratory system, develop these concepts and use the concepts to explain events in everyday life.
	Sub-CLO10	Communicating concepts related to the circulatory system, developing these concepts and using the concepts to explain events in everyday life
	Sub-CLO11	Communicating right related concepts _ system excretion
	Sub-CLO12	Communicating the nervous system to humans, developing these concepts and using the concepts to explain events in everyday life
	Sub-CLO13	Communicating concepts related to the reproductive system, developing these concepts and using them to explain events in everyday life
	Sub-CLO14	Communicate concepts related to inheritance, develop these concepts and use them to explain and present events in everyday life
	Sub-CLO15	Communicating concepts related to biotechnology, developing these concepts and using the concepts to explain events in everyday life
Description MK	This course examines the concept of energy and its role in everyday life systems including biological systems, forms of energy and their changes, photosynthesis (photosystem 1, photosystem 2, phosphorylation and carbon fixation), pathways of energy conversion (oxidation, glycolysis, cycle Krebs, and the respiratory chain).	
Study Materials/Learning Materials	a. Characteristic features creature life b. Ecosystem c. Continuity life d. Structure and function of plant organs e. Response plant f. Photosynthesis g. Movement tools active and passive h. System digestion i. System breathing System circulation blood j. System excretion k. System nerves in humans l. System reproduction m. Heir characteristic	

	n. Biotechnology
References	**main :**
	1. Appling, DR, Anthony Cahill, SJ, Mathew, CK (2016). *Biochemistry: Concepts and Connections* . Pearsons 2. Pattabhi , V. And Ghautam , N. (2002). *Biophysics* . NewDelhi , Kluwer Academic Publishers. 3. Waigh , T. (2007). *Applied Biophysics* . Willey
	Supporters :
	1. Articles _ relevant from journal reputable
Supporting Lecturer	Prof. Dr. Hj. Rudiana Agustini, M.Pd.
Prerequisite Courses	

Week-	**Final ability each stage of learning (Sub-CLO)**	**Indicator**	**Assessment form**	**Learning Methods/Models (Estimated time)**		**Material Learning (References)**	**Rating Weight (%)**
				offline (*offline*)	**(*online*)**		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Communicating related concepts characteristic features creatures live , develop draft it and use draft tbs and use draft For explain event in life daily	• describe features _ creatures life • identify error draft characteristic features creatures life • Teach draft characteristic features creatures life from the resulting worksheets .	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Characteristic features creature life [1, 2, 3]	
2	presenting are related concepts ecosystem , develop concepts _ _ tbs and use draft For explain incident in life everyday _ _	• Explain draft ecosystem • identify error draft ecosystem • Do practice influence factor abiotic of the resulting worksheets .	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE),	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa	Ecosystem [1, 2, 3]	

Week-	Final ability each stage of learning (Sub-CLO)	Indicator	Assessment form	Learning Methods/Models (Estimated time)		Material Learning (References)	Rating Weight (%)
				offline (*offline*)	(*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Midterm Exam (ME)		• Time: 2 x 50 minutes		
3	Communicating right the best concepts hook continuity live , develop concepts tbs and use draft For explain incident in life daily	Compare ber like type adaptation . identify error draft continuity life Teach draft selection natural of the resulting worksheets	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Continuity life [1, 2, 3]	
4	communicate related concepts _ structure and function of plant organs , develop concepts tbs and use draft For explain incident in life daily	• Explain connection structure and function of plant organs • identify error draft plant structures and organs Observe structure roots , stems , leaves with use microscope	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Structure and function of plant organs [1, 2, 3]	
5	presenting right related concepts _ response plant , develop concepts tbs and use draft For explain incident in life everyday .	• Explain and give example various type response plant • identify error draft response plant Determine type response plant from photos / pictures various response plant	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE),	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa	Response plant [1, 2, 3]	

Week-	Final ability each stage of learning (Sub-CLO)	Indicator	Assessment form	Learning Methods/Models (Estimated time)		Material Learning (References)	Rating Weight (%)
				offline (*offline*)	(*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Midterm Exam (ME)		• Time: 2 x 50 minutes		
6	communicate related concepts _ photosynthesis develop concepts _ _ tbs and use draft For impressive incident in life everyday .	• Explain draft photosynthesis • identify to mistake draft photosynthesis Apply steps method scientific related test Engelmen	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Photosynthesis [1, 2, 3]	
7	communicate related concepts _ tool motion , develop concepts _ _ tbs and use draft For explain incident in life everyday .	• Compare tool motion active and passive • identify to mistake draft tool motion , . Observe tool motion active and passive .	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Movement tool active and passive [1, 2, 3]	
8	**Mid Semester Exams**						
9	Communicating right related concepts _ system digestion , develop concepts tbs and use draft For explain incident in life daily	• Explain draft system digestion • identify error draft system digestion Test content material food	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE),	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible	System digestion [1, 2, 3]	

Week-	Final ability each stage of learning (Sub-CLO)	Indicator	Assessment form	Learning Methods/Models (Estimated time)		Material Learning (References)	Rating Weight (%)
				offline (*offline*)	(*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Midterm Exam (ME)		_ _ through vinesa • Time: 2 x 50 minutes		
10	• communicate related concepts _ with system breathing , develop concepts tbs and use draft For explain incident in life everyday . • communicate related concepts _ system circulation blood , develop concepts tbs and use draft For explain incident in life daily	• Explain draft system breathing • identify error draft system breathing • Do practice lung volume capacity • Compare system circulation blood big and small • identify error draft system circulation blood • Do simulation circulation blood big and small	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	System breathing System circulation blood [1, 2, 3]	
11	Communicating right related concepts _ system excretion	• Explain system excretion • identify error draft system excretion • Do practice system excretion of the resulting worksheets	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	System excretion [1, 2, 3]	
12	communicate system nerves in humans , develop concepts _ _ tbs and use draft For explain incident in life daily	• Explain system nerves in humans • identify error draft system nerves in humans	Criteria : Test Written Shape : Result of Presentation papers , papers ,	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet	System nerves in humans [1, 2, 3]	

Week-	Final ability each stage of learning (Sub-CLO)	Indicator	Assessment form	Learning Methods/Models (Estimated time)		Material Learning (References)	Rating Weight (%)
				offline (*offline*)	(*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		• Do practice system nerves in humans of the resulting worksheets	papers, Final Exam (FE), Midterm Exam (ME)		• Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes		
13	communicate related concepts _ system reproduce , develop concepts tbs and use For explained right incident in life daily	a. Explain system reproduction b. identify error draft system reproduction c. Teach method care for the reproductive organs	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	System reproduction [1, 2, 3]	
14	Communicating right related concepts _ inheritance properties, expand right concepts tbs and use For explain and present incident in life daily	• Explain term inheritance properties , Mendel's law I, II, means wrote genes, genotypes • identify error draft heir characteristic • Do practice cross monohybrid , dihybrid of the resulting worksheets	Criteria : Test Written Shape : Result of Presentation papers , papers , papers, Final Exam (FE), Midterm Exam (ME)	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet • Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes	Inheritance of Nature [1, 2, 3]	
15	communicate related concepts _ biotechnology , develop concepts _ _ tbs and use draft For explain incident in life daily	• Explain draft biotechnology • give example results biotechnology conventional and modern	Criteria : Test Written Shape : Result of Presentation	Studies references , assignments , discussions and presentations	• Coordination lectures using WAGS • Synchronous via Zoom/ gmeet	Biotechnology [1, 2, 3]	

Week-	Final ability each stage of learning (Sub-CLO)	Indicator	Assessment form	Learning Methods/Models (Estimated time)		Material Learning (References)	Rating Weight (%)
				offline (*offline*)	(*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		• Do practice biotechnology conventional / visiting industry modern biotechnology , eg chorella	papers , papers , papers, Final Exam (FE), Midterm Exam (ME)		• Material , information and tasks accessible _ _ through vinesa • Time: 2 x 50 minutes		
16	**Final Exam (FE)s**						

Description :

1. **Learning Outcomes of Study Program Graduates (CPL-Prodi)** are abilities possessed by each Study Program graduate; is the internalization of attitudes, mastery of knowledge and skills (general and specific) in accordance with the study program level obtained through the learning process.
2. **CPL-Prodi imposed on MK** are several CPL-Prodi which underlie the formation/development of a course consisting of aspects of attitude, general skills, special skills, and knowledge.
3. **Course Learning Outcomes (CLO)** are abilities that are specifically described from the CPL-Prodi imposed on MK, which will be achieved after learning a particular course; specific to the study material or learning material for the course.
4. **Subject Sub-CP (Sub-CLO)** is a capability that is specifically described from CLO that can be measured or observed and is the final ability that is planned at each stage of learning; specific to the learning material of the course.
5. **Indicators** are markers for the achievement of Sub-CLO, in the form of specific and measurable statements that show the achievement of abilities, both in the process and in student learning outcomes.

6. **Forms of assessment** include assessment techniques, forms of instruments, and assessment criteria. Assessment techniques include observation, written tests, oral tests, and performance (*performance assessment*). Preference will be given to assessment through *performance assessment* based on real assignments that support the completion of a thesis/dissertation. The form of the assessment instrument and criteria is adjusted to the technique chosen by taking into account the principles of an educational,
authentic, objective, accountable and transparent assessment .
7. **Learning method:** learning is carried out in a *hybrid-learning manner* , a mix of online and offline in a planned manner. Online learning is encouraged to utilize Vinesa (*virtual learning by Unesa*) and can be combined with other online learning *platforms* . Learning can be through expositories, discussions, seminars, presentations, practicum, internships/field practice, assignments, and/or other equivalent forms of learning. Preference will be given to learning methods that activate students in solving real problems.
8. **Learning Model:** lectures are prioritized using problem solving learning models, either in the form of case *-method* , problem - *based learning* , and *project-based learning* . Each sequence of certain learning stages is included in the estimated time required.

9. **Learning Materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics. Also include literature that is relevant to the study material.
10. **The weight of the assessment** is the percentage of the assessment of each achievement of the sub-CLO which is proportional to the weight of the performance in achieving the sub-CLO; the total weight of the assessment is 100%.
11. **The final assessment weight formula** according to Unesa's academic guidelines:

$$\text{Final value} = \frac{2P + 3T + 2UTS + 3UAS}{10}$$

Note: P = participation; T = Task; UTS = Mid Semester Examination; and UAS = Final Semester Examination

12. **Midterm Exam (ME)** and **Final Exam (FE)** do not have to be in the form of a test. Can use other forms of assessment, for example presentations, writing papers, completing projects, and others, but must be submitted to students at the beginning of the semester and equipped with objective, accountable, and transparent assessment guidelines .
13. In order to realize **independent learning on an independent campus** in the Postgraduate environment, each Study Program can design lectures:
    a. collaboration with similar study programs at other universities in the country to conduct guest lectures or joint lectures.
    b. designing certain MKs is submitted using international languages, so that foreign students can participate and vice versa as a *credit earning/credit transfer program* .
    c. cooperate with industry or other institutions oMidterm Exam (ME)ide the university in the form of internships, providing training, holding scientific forums, or other forms of collaboration to enrich the learning experience.

    Activities 13 a, b, and c are carried out with due regard to the respective CPL-Prodi and CLO and are based on a clear cooperation agreement (MoA/ *Memorandum of Agreement* or IA/ *Implementation Arrangement*)

Telah Divalidasi

Unit Penjaminan Mutu Prodi S2
Pendidikan Sains.

Dr. Titin Sunarti, M.Si.

Surabaya, 15 Agustus 2022

Koordinator Mata Kuliah,

Prof. Dr. Hj. Rudiana Agustini, M.Pd.
M.Pd.

Mengetahui,

Ketua Prodi S2 Pendidikan Sains,

Dr. Eko Hariyono, S.Pd., M.Pd.

A.4. MAPPING OF LEARNING OUTCOMES – COURSE OUTCOMES

ASPECTS	PLO	Kode
Knowledge	1. Mastering the philosophy of science education as a basis for thinking in developing superior innovations in the field of science education	**KNO-1**
	2. Mastering knowledge and technology in the fields of physics, chemistry, biology, and science, supported by the latest IT	**KNO-2**
	3. Mastering the theory of pedagogy and andragogy in the field of science education and able to package science learning through the TPACK (Technological, Pedagogical, and Content Knowledge) framework	**KNO-3**
Skill	4. Developing logical, critical, systematic, and creative thinking in the field of science through scientific studies and compiling scientific conceptions and studies based on scientific principles, procedures, and ethics in the form of a thesis.	**SKI-1**
	5. Able to solve science education problems with a multi and interdisciplinary approach, as well as documenting and communicating them through accredited national journals, international journals, or other media to the wider community through development research methodologies based on current issues	**SKI-2**
	6. Manage, develop, and maintain network to improve self-capacity in local, national, and international scope	**SKI-3**
Competency	7. Design, implement, and evaluate the science education curriculum to develop more effective learning innovations	**COM-1**
	8. Design and develop innovative learning materials (lesson plan, teaching materials, student work sheet, media, and/or assessment instruments) to solve learning problems and improve the quality of scientific learning	**COM-2**
	9. Designing and creating a conducive scientific learning environment to carry out active learning and reflecting to determine its effectiveness	**COM-3**
Attitude and Social	10. Have honest, independent, caring, tough, and leadership-minded attitude/character	**SOC-1**
	11. Have the ability to develop themselves continuously	**SOC-2**

A4.2. The Education Program Objectives (PEOs) Of Study Of Study Science I

The Unesa Postgraduate Science Education Master Program aims to produce graduates who have the potential as academics, teachers, lecturers, educational consultants, researchers, and scientific developers who have the following characteristics:

PEO 1. Able to manage and develop science/science educational research programs to solve educational problems that develop in society through multi and interdisciplinary approaches.

PEO 2. Able to develop TPACK (Technology, Pedagogy, Content Knowledge)-based science learning materials, so that they get recognition at both national and international levels.

PEO 3. Able to build mutually beneficial cooperation networks in the field of science education in local, national, and international scope.

PEO 4. As an individual who has professional ethics and character (PEO-4)

PEO 5. Able to develop themselves continuously and sustainably through education, training, and/or other self-development activities both formal and informal (PEO-5)

A4.3. Mapping of Program Learning Outcomes (PLO) – Education Program Objectives (PEOs)

	PLO 2 (KNO-2)	PLO 9 (COM-3)
PEO 1	√	
PEO 2	√	√
PEO 3		√
PEO 4		
PEO 5	√	

B. COURSE ASSESSMENT

B.1. Assessment Rubric

Cognitive Criteria

1. The ability to give answers correctly
2. The ability to provide argumentation according to theory
3. The ability to provide systematic explanations
4. The ability to solve problems comprehensively

B.2. Assessment System

Final Assessment Course:

Group/Individuals Assignment : 30%
Midterm examination : 30%
Final Exam (FE)ination : 40%

Distribution of the weight of the ability of the test item

	PLO 2 (KNO-2)	PLO 9 (COM-3)	Total
Group/Individuals Assignment	30%	70%	100%
Midterm examination	40%	60%	100%
Final Exam (FE)ination	40%	60%	100%

Success Criteria of Program Learning Outcomes (PLO)

Excellence	≥ 85
Good	≥ 70
Satisfy	≥ 55
Fail	> 0

Final index for undergraduate program defined as follow:

Final Index	Range
A	4 (85 ≤-≥ 100)
A^-	3,75 (80 ≤-< 85)
B+	3,5 (75 ≤- < 80)
B	3 (70 ≤-< 75)
B-	2,75 (65 ≤-<75)
C+	2,5 (60 ≤-<65)
C	2 (55 ≤-<60)
D	1 (40 ≤-<55)
E	0 (0 ≤-<40)

C. COURSE DEVELOPMENT

C.1. Academic Year 2019/2020 Odd Semester

Parameter	∑ of person	Percentage
Number or students taking this subject	39	100%
Number of students who pass at first attempt (>C^+)	39	100%
Number of students who pass at first attempt (= C)	0	0%
Number of failed students after remedial (D & E)	0	0%

C.2. Problems Analysis

In 2019/2020 academic year in The Study of Science I, there were 100% students had passed the examination at the first attempt. At the end of the Semester Examination there is not remedial test for students. Therefore, the improving learning strategies / methods were required to achieve the better results.

C.3. Solutive Strategy

New teaching and learning methods should be developed for the next academic years, consisting of:

1. There needs to be a group study in understanding The Study of Science I, so that students teach each other, and peer tutors occur.
2. Enhance the cooperative skills of students with exchange the methods and models of learning

D. APPENDICES

D.1. DOCUMENT OF COURSE ACTIVITY

D.1.1. Lecture's journal and student's attendance form siakadu.uneca.ac.id for MPSE Class-2019

Pertemuan	Tanggal / Dosen	Topik	Status	BA PTMPT	Peserta PTMPT	Peserta	EDIT/SIMPAN	Peserta	Barcode
Ke 1	3 Februari, 2020 **Dosen:** TJANDRAKIRANA Anda sudah tidak dapat melakukan pengajuan perubahan pada pertemuan ini.	penjelasan RPS dan pembagian tugas	Ganti	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	15	Edit		
Ke 2	10 Februari, 2020 **Dosen:** TJANDRAKIRANA Anda sudah tidak dapat melakukan pengajuan perubahan pada pertemuan ini.	Immonologi	Ganti	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	16	Edit		
Ke 3	17 Februari, 2020 **Dosen:** TJANDRAKIRANA	1. Konsep energi 2. Macam energi Berdasarkan bentuk dan sumber 3. Perubahan energi	Terjadwal	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	18	Edit		
Ke 4	24 Februari, 2020 **Dosen:** TJANDRAKIRANA	1. Manfaat energi dalam kehidupan sehari-hari	Terjadwal	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	18	Edit		
Ke 5	2 Maret, 2020 **Dosen:** TJANDRAKIRANA	Presentasi dan diskusi mengenai fotosintesis	Terjadwal	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	17	Edit		
Ke 6	9 Maret, 2020 **Dosen:** TJANDRAKIRANA	Presentasi dan diskusi energi pada proses Fotosintesis	Terjadwal	Isi BA PTMPT Cetak BA PTMPT	Peserta PTMPT Cetak Peserta PTMPT	18	Edit		

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI

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laman: unesa.ac.id
email : bakpk@unesa.ac.id

Aktivitas Perkuliahan

Nama Matakuliah : Kajian IPA 1 **Dosen** : RUDIANA AGUSTINI (196008101990022001)
TJANDRAKIRANA ()

Kelas : 2019D

Jadwal & Ruang : X03.03.05 (10.20 - 12.00) R.

No.	Tanggal	Pertemuan	Topik	Peserta	Status	Dosen	Kesesuaian	Saran
1	03-02-2020	Pertemuan ke 1	penjelasan RPS dan pembagian tugas	15	Ganti	Tjandrakirana		
2	10-02-2020	Pertemuan ke 2	Immonologi	16	Ganti	Tjandrakirana		
3	17-02-2020	Pertemuan ke 3	1. Konsep energi 2. Macam energi Berdasarkan bentuk dan sumber 3. Perubahan energi	18	Terjadwal	Tjandrakirana		
4	24-02-2020	Pertemuan ke 4	1. Manfaat energi dalam kehidupan sehari-hari	18	Terjadwal	Tjandrakirana		
5	02-03-2020	Pertemuan ke 5	Presentasi dan diskusi mengenai fotosintesis	17	Terjadwal	Tjandrakirana		
6	09-03-2020	Pertemuan ke 6	Presentasi dan diskusi energi pada proses Fotosintesis	18	Terjadwal	Tjandrakirana		
7	16-03-2020	Pertemuan ke 7	1. Metabolisme karbohidrat	18	Terjadwal	Tjandrakirana		

D.1.2. Example recap of student attendance at Study of Science I for MPSE Class 2019



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
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PRESENSI KULIAH
Periode 2019/2020 Genap

Mata Kuliah : Kajian IPA 1
Kelas : 2019D
Prodi : S2 Pendidikan Sains

Dosen : Prof. Dr. Hj. Rudiana Agustini, M.Pd.
TJANDRAKIRANA

No	NIM	Nama Mahasiswa	Pertemuan Ke															%
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
			03 Feb 20	10 Feb 20	17 Feb 20	24 Feb 20	02 Mar 20	09 Mar 20	16 Mar 20	23 Mar 20	30 Mar 20	06 Apr 20	13 Apr 20	20 Apr 20	27 Apr 20	04 May 20	11 May 20	
1.	18070795037	HANIFA RACHMAH KAMILA	H	H	H	H	I	H	H	H	H	H	H	H	H	H	H	100 %
2.	19070795002	MERCURY NIRWANA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
3.	19070795014	CHOLIFATUR RIZKA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
4.	19070795015	MASNA AWALIYAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
5.	19070795016	RADDINA APRILIA PUTRI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
6.	19070795024	NURUL LATHIFATUL HAKIMAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
7.	19070795030	RISKI DWI FANANI	I	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
8.	19070795031	FARIDA ARIFAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
9.	19070795032	NURLITA CANDRA DEWI	I	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
10.	19070795035	IMAS NUR MAZIDAH	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
11.	19070795036	ANINDYA PRIMADAYUNING PUTRI	H	I	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
12.	19070795037	FERA LINDRA ISMAWANTI	I	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
13.	19070795039	DHANANG SETYO ERVANA	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
14.	19070795040	AISYAH JIYANTIKA GITADEWI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
15.	19070795041	MULYONO	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
16.	19070795042	NISA AULIYAH	H	S	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
17.	19070795045	ANGGRAENI RUSMIA PUTRI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
18.	19070795047	DESY SURYANI	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	100 %
Tanda Tangan Dosen / Asisten																		

D.2. SAMPLE OF STUDENT WORK

D.2.1. Sample of Test Paper

EXAM MIDDLE SEMESTER ODD YEAR ACADEMIC 2022/2023

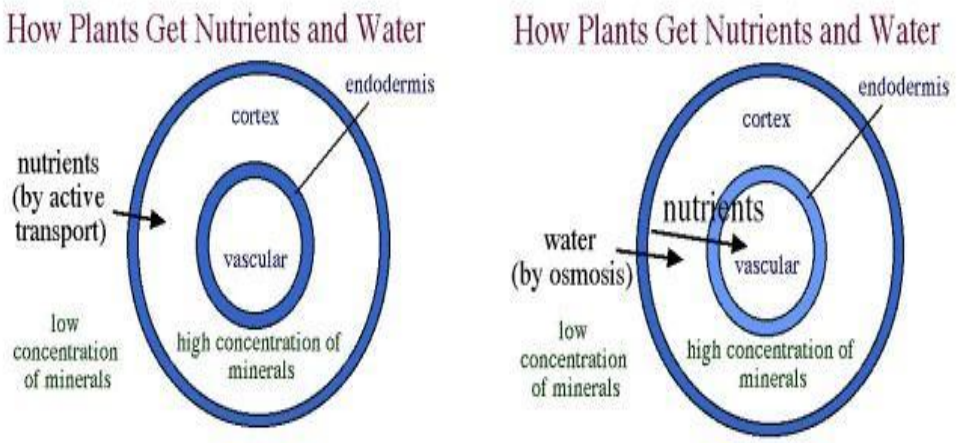
Course	: Study Of Science 1
Lecturer	: Dr. Yuni Sri Rahayu, M. Si. Dr. Sunu Kuntjoro, M.Sc. beni Setiawan, Ph.D.
Study Program/Class/Class	: Master Program Science Education

Instruction:

a. pray before start read question And do UTS
b. Moreover formerly, read it whole question in a manner careful.
c. Do UTS This in a manner **Honest** with answer in a manner systematic And concise
d. do it sheet answer in a manner separated For question A, B, And C

QUESTION A

Take note picture following!



1. Based on picture, analyze it things as following.
   a. How mechanism transport ions mineral from outside body plant going to to plant body?
   b. How mechanism transport water from outside body plant going to to body plant?

c. How water mechanism and hara from xylem root to xylem leaf?
d. Define track Which skipped by mechanism short distance transport.
e. Define track Which skipped by mechanism long-distance transport.

2. The process of transporting the results of photosynthesis has a mechanism known as theory phloem loading or the pressure flow hypothesis. Analyze what will happen with transport through the phloem if plant conditions in the following circumstances:
   a. experience stress water.
   b. plants are in hot environmental conditions and strong winds, temporary water is in abundance.

D.2.2. Sample of Student's Work from MPSE Class-2019

Nama : Leni Dwi Septiany
NIM : 22070795019
Kelas : S2 Pendidikan Sains B
Mata Kuliah : Kajian IPA 1

UJIAN TENGAH SEMESTER

KAJIAN IPA 1

SOAL A

1. Hasil analisis
   a. Mekanisme pengangkutan ion-ion mineral dari luar tubuh tanaman menuju ke tubuh tanaman
      Seperti terlihat pada gambar bawa nutrien/ mineral masuk ke dalam bagian korteks melalui transport aktif. Dimana transport aktif merupakan pergerakan zat dari yang konsentrasi tinggi ke konsentrasi rendah. Karena pergerakannya demikian transport aktif membutuhkan ATP dalam prosesnya. Kadar nutrien di luar korteks lebih rendah konsentrasinya daripada di dalam korteks. Sehingga nutrien berpindah secara transpor aktif dari luar korteks yang rendah ke dalam korteks yang konsentrasi mineral tinggi. Karena konsentrasi mineral dalam korteks tinggi maka potensial air rendah sehingga air akan masuk secara osmosis ke dalam korteks dan menekan nutrien untuk masuk menembus endodermis menuju vascular.
   b. Mekanisme pengangkutan air dari luar tubuh tanaman menuju ke tubuh tanaman
      Pada gambar dapat diketahui bahwa air masuk ke dalam korteks melalui peristiwa osmosis. Osmosis adalah berpindahnya air dari yang potensial air tinggi ke potensial air rendah. Ketika korteks mengandung nutrient dengan konsentrasi tinggi maka potensial airnya rendah dibandingkan di luar korteks sehingga air akan berosmosis dari luar korteks yang potensial air tinggi ke dalam korteks yang potensial air rendah.
   c. Mekanisme air dan hara dari xylem akar ke xylem daun
      Dapat dijelaskan dengan teori kapilaritas pada daun dan teori *water active from soil*. Terdapat perbedaan potensial air baik pada akar, batang, dan daun. Pada akar potensial air lebih tinggi daripada di batang, kemudian di daun karena proses transpirasi melalui membuka/menutupnya stomata sehingga air menguap ke udara. Potensial air mempengaruhi pergerakan air. Ketika di batang potensial airnya rendah maka air akan naik melalui xylem menuju ke batang. Kemudian naik ke daun yang airnya telah menguap dalam proses transpirasi. Batang juga memiliki daya kapilaritas yang dipengaruhi oleh gaya kohesi dan adhesi di batang. Adhesi terjadi ketika ikatan molekul air dengan dinding pembuluh xilem namun ikatannya lemah. Berbeda dengan gaya kohesi terjadi ikatan tarik menarik antara molekul air yang satu dengan yang lain di sepanjang pembuluh xylem
   d. Jalur yang dilewati oleh mekanisme short distance transport
      Air akan masuk ke sel-sel akar menuju pembuluh xylem disebut dengan *short distance transport*/ transport radial. Dalam proses ini, molekul air akan masuk melalui 3 jalur yaitu :

D.3. RECAPITULATION OF ASSESSMENT

D.3.1. Validate Test Item

The test for the end of semester evaluation consists of questions in the form of essays which have been analyzed by the lecturer in the Study of Science I. The essay question is validated by paying

attention to several aspects, namely the suitability of the problem with indicators, language, content and construct.

D.3.2. Evaluation Results of Study of Science I for MPSE Class 2018A

PROGRAM STUDI S2 Pendidikan Sains
DAFTAR NILAI MAHASISWA
Mata Kuliah : Kajian IPA 1
Kelas : 2019D
Tahun Ajaran : 2019/2020 Genap

Original data :

Keterangan :
1. Komponen nilai yang diisi hanya : Part,Tugas,UTS dan UAS
2. Nilai UAS mahasiswa dengan kehadiran dibawah 73.3% (kolom dg warna merah) tidak akan disimpan
3. Jangan merubah apapun di dokumen ini kecuali pada point nomer satu di atas.
4. PPTI / BAAK tidak menerima file nilai untuk diupload. Proses upload nilai dilakukan oleh dosen pengampu yang bersangkutan.

No	NIM	Nama Mahasiswa	Angkatan	Kehadiran	Part	Tugas	UTS	UAS	NA	Huruf	Pakai
1	18070795037	HANIFA RACHMAH KAMILA	2018	100%	78	79	85	80	80.3	A-	1
2	19070795002	MERCURY NIRWANA	2019	100%	80	82	70	73	76.5	B+	1
3	19070795014	CHOLIFATUR RIZKA	2019	100%	78	74	80	73	75.7	B+	1
4	19070795015	MASNA AWALIYAH	2019	100%	78	82	70	75	76.7	B+	1
5	19070795016	RADDINA APRILIA PUTRI	2019	100%	78	84	85	78	81.2	A-	1
6	19070795024	NURUL LATHIFATUL HAKIMAH	2019	100%	85	82	85	75	81.1	A-	1
7	19070795030	RISKI DWI FANANI	2019	100%	93	85	80	83	85	A	1
8	19070795031	FARIDA ARIFAH	2019	100%	75	84	90	83	83.1	A-	1
9	19070795032	NURLITA CANDRA DEWI	2019	100%	78	79	85	83	81.2	A-	1
10	19070795035	IMAS NUR MAZIDAH	2019	100%	73	74	70	80	74.8	B	1
11	19070795036	ANINDYA PRIMADAYUNING PUTR	2019	100%	80	82	85	85	83.1	A-	1
12	19070795037	FERA LINDRA ISMAWANTI	2019	100%	83	79	70	80	78.3	B+	1
13	19070795039	DHANANG SETYO ERVANA	2019	100%	83	77	80	82	80.3	A-	1
14	19070795040	AISYAH JIYANTIKA GITADEWI	2019	100%	75	79	70	70	73.7	B	1
15	19070795041	MULYONO	2019	100%	85	84	90	85	85.7	A	1
16	19070795042	NISA AULIYAH	2019	100%	75	77	70	75	74.6	B	1
17	19070795045	ANGGRAENI RUSMIA PUTRI	2019	100%	80	79	80	83	80.6	A-	1
18	19070795047	DESY SURYANI	2019	100%	75	74	70	70	72.2	B	1

D.3.3. Percentage of PLO achievements of Study of Science I at Academic Year 2019/2020 for MPSE Class 2019

PLO ASSESSMENT

Lecture : Kajian Sains IPA 1
Code : 8410102206
Department : S2 Pendidikan Sains
Total of Student : 38

	PLO-3	PLO-10						
EXELENCE	16%	13%						
GOOD	84%	87%						
SATISFY	0%	0%						
FALSE	0%	0%						
	100%	100%						

