LIST OF MODULES HANDBOOK FOR STUDENT EXCHANGE AND INTERNATIONAL CREDIT TRANSFER PROGRAM

UNDERGRADUATE PROGRAM IN SCIENCE EDUCATION
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS NEGERI SURABABAYA
2021

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SEMESTER III

Module Name:	History and Philosophy of Science Education *Sejarah dan Filsafat Pendidikan IPA*
Module Level:	Bachelor Degree/Undergraduate Program
Course Code:	8420103067
Abbreviation, if applicable:	SFPI
Sub-heading, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	III/second year (sophomore)
Module coordinator(s):	Ahmad Qosyim, S.Si., M.Pd.
Lecturer(s):	Prof. Dr. Erman, M.Pd. Ahmad Qosyim, S.Si., M.Pd. Guntur Tri Mulyono, S.Si., M.Si.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	2 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.18 ECTS**
Credit point:	2 *sks* (3.18 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. Using ICT to explore the science philosophers' ideas in Greek, Dark age, renaissance, and modern philosopher and their application in science educational research 2. Apply scientific demarcation area to differentiate science, pseudo-science and religion 3. Explain history and principles of scientific method, falsification, including their application in science education 4. Explain the difference of realism and antirealism ideas in science educational context **Sub-CLOs:** 1. Describe the development of the philosophy of science that underlies the development of science: Definition and characteristics of science philosophy, Distinguishing knowledge, sciences and science, Distinguishing the

<table>
<tr><td></td><td>domains of metaphysics, philosophy and scientific method, Distinguishing science, pseudoscience and religion and to describe the application scientific demarcation area to differentiate science, pseudo-science and religion;
2. Distinguishing views / thoughts / focus of studies on science philosophy schools from ancient Greece to modern times, through search the literature from various sources / ICT for science philosophers' ideas in Greek, Dark age, renaissance, and modern philosopher;
3. Explain the basic principles of science justification up to the discovery of the scientific method in overcoming debates / problems and making decisions about science.
4. Distinguishing views of realism and anti-realism, as well as the principle of underdetermination in the development of science; and
5. Students can critically analyze the implementation and role of several philosophical views in science education to support their professional duties as a science teacher.</td></tr>
<tr><td>Content:</td><td>Assessing philosophy in the context of science and learning through critical analysis of the thought process and discovery of science products by natural science philosophers / scientists, including their justification from various learning sources / media that have developed from time to time and their application in the context of science education, based on the viewpoint of educational philosophy through critical analysis of education and science learning problems / issues / policies so as to produce logical solutions and make decisions appropriately and responsibly.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

<table>
<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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</td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centred approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, and worksheets</td></tr>
<tr><td>Literature (main references):</td><td>1. Thomas J. Hickey, 2011, Introduction to phisophy of science. NewYork: Springer
2. Craigh Dilworth, 2006, The methaphysics of science:</td></tr>
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	Boston studies in the philosophy of science, Netherland: Springer. 3. Cornel M. Hamm, 2005, Philosophycal Issues in Education: An introduction, London: Routledge. 4. James Ladyman, 2002, Understanding philosophy of science, London and New York: Roudledge 5. Anna Poedjiadi, 2001, Filsafat Ilmu Kependidikan, Bandung 6. Wilburg Applebaum, 2005, The scientific revolution and the foundation of modern science, London: Greenwood Press 7. Referensi lain yang relevan
Notes:	*__1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)__ according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**__1 sks = 1,59 ECTS__

Module Name:	*Zat dan Energy* (Matter and Energy)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103158
Abbreviation, if applicable:	ZE
Courses included in the module, if applicable:	Not applicable
Semester/term	III/second year (sophomore)
Module coordinator(s):	Tutut Nurita, S.Pd., M.Pd.
Lecturer(s):	Tutut Nurita, S.Pd., M.Pd. Muhamad Arif Mahdiannur, S.Pd., M.Pd. Ernita Vika Aulia, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Ability to make a decision based on information and data analysis and able to give direction and to choose alternative solutions; 2. Ability to mastery the theoretical concepts of matter and energy and able to formulate it to solve problem procedurally; 3. Ability to utilize science and technology instruments in the field of matter and energy and ability to adapt toward current facing problem related to solving a problem; 4. Ability to identify the state of matter (solid, liquid, and gas), analyze phase diagram (phases of matter and transitions), analyze the state of matter change process, describe temperature and heat, and identify form of energy that happens in everyday life; 5. Ability to identify and to analyze the expansion of matter, describe the thermodynamics concepts and analyses it in everyday life phenomena, describe mechanical energy due to conservation of energy, solve a problem that related to the conservation of mechanical energy, describe the conservation law in

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<tr><td></td><td>energy and its application on simple machine's mechanical advantages;
6. Ability to demonstrate responsibility in their conduct and behavior in the classroom and scientific investigation, especially on delivering the information.</td></tr>
<tr><td>Content:</td><td>State of matter; Phases diagram (phases of matter and transitions); Temperature and heat; Form of energy; History of energy concept; Conservation of energy; Mechanical energy; Simple machine; and Thermodynamics.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><td>Learning Methods</td><td>Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint, hand out, simulation, and e-learning Vinesa (https://vinesa.unesa.ac.id/course/view.php?id=374)</td></tr>
<tr><td>Literature (primary references):</td><td>1. National Research Council. (2004). Advanced Energetic Materials. National Academies Press.
2. National Research Council. (2004). Materials count: The Case for Material Flows Analysis. National Academies Press.
3. Horton, P., McCarthy, T., Werwa, E., & Zike, D. (2005). Physical Science: K. The Nature of Matter. Glencoe/McGraw-Hill.
4. Silberberg, M. (2018). Chemistry: The Molecular Nature of Matter and Change with Advanced Topics. McGraw-Hill.
5. Giambattista, A., McCarthy Richardson, B., & Richardson, R. C. (2010). Physics (2nd ed.). McGraw-Hill.
6. Moran, M. J., Shapiro, H. N., Boettner, D. D., & Bailey, M. B. (2011). Fundamentals of Engineering Thermodynamics (7th ed.). John Wiley & Sons.</td></tr>
<tr><td>Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year</td></tr>
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	2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Ilmu Sosial dan Budaya Dasar* (Social and Culture Study)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420102060
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not applicable
Semester/term	III/second year (sophomore)
Module coordinator(s):	Pambudi Handoyo, S.Sos., M.A.
Lecturer(s):	Pambudi Handoyo, S.Sos., M.A.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Master theoretical concepts about diversity and equality and human beings, and be able to formulate procedural solutions to various social and cultural problems.; 2. Obtain, collect, and process various social and cultural facts in order to solve various social and cultural problemsand; 3. Take strategic decisions based on analysis of information and data, and provide guidance in choosing various alternative solutions in solving and solving various social and cultural problems; 4. Demonstrate religion values and cultures as well as academics etiquette in doing professional task; and 5. Demonstrate religion values and cultures as well as academics etiquette in doing professional task.
Content:	Understanding of cultures, its history and values as well as show understanding on the danger of globalization and the alternatives ways in solving cultural problems
Attribute Soft skill:	Collaboration, communication, and argumentation in the natural classroom setting.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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</td></tr>
<tr><td>Learning Methods</td><td>Discussion, presentation (structured activities), and lecturing</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, whiteboard, and virtual learning platform</td></tr>
<tr><td>Literature (primary references):</td><td>1. Herimanto. 2013. Ilmu Sosial dan Budaya Dasar. Jakarta: Bumi Aksara.
2. Arifin, Zainal. 2012. Ilmu Sosia, Budaya Dasar. Makassar: Anugrah Mandiri.
3. Hartono. 1997. Ilmu Sosial Dasar. Jakarta: Bumi Aksara.
4. Umanggor, Rusmin, dkk. 2008. Ilmu Sosial & Budaya Dasar. Jakarta: Kencana Pernada.
5. Urbanus Ura Weruin, 2014. Manusia, Kebudayaan, dan Masyarakat, Jakarta: Pustaka Mandiri,(UUW-1).
6. Urbanus Ura Weruin, 2015. Visi Baru tentang Kebudayaan, Jakarta: Pustaka Mandiri.
7. Elly M. Setiadi, 2009. Ilmu Sosial Budaya Dasar. Jakarta: Kencana.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
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Module Name:	*Biomekanika* (Biomechanics)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103053
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not applicable
Semester/term	III/Second year (Freshmen)
Module coordinator(s):	Dr. Elok Sudibyo, M.Pd.
Lecturer(s):	Dr. Elok Sudibyo, M.Pd. Dra. Martini, M.Pd. Dhita Ayu Permata Sari, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	– General Physics (Code: 8420103045) – General Chemistry (Code: 8420103074) – General Biology (Code: 8420103023)
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Apply basic science basic knowledge of physics, chemistry, and biology to describe phenomena and process of movement in living things by utilizing relevant ICTs; 2. Communicate ideas and research result related to movement in living things both orally or in writing; 3. Demonstrate decision making skills during laboratory activity.
Content:	Kinetics, kinematics, plant movement, human/animal movement.
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

Assessment Components	Percentage Contribution
Participation	20%
Assignment	30%

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<tr><td></td><td><table>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, and worksheets.</td></tr>
<tr><td>Literature (primary references):</td><td>1. Hamill, J. & Knutzen, K. M. 2015.Biomechanical Basis of Human Movement.Second Edition. Philadelphia: Lippincott Williams & Wilkins.
2. Giancoli, Douglas C. 2016. Physics: Principles with Applications 7th Edition. Boston: Pearson.
3. Beck, Charles B. 2010. An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book. New York: Cambridge University Press.
4. Trefil, J. and Hazen, R.M., 2016. The Sciences: An Integrated Approach. Wiley Global Education.
5. Reece, J. B., Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., & Jackson, R. B. (2014). Campbell biology (No. s 1309). Boston, MA: Pearson.
6. Taiz, L. and Zeiger E. 2010. Plant Physiology, Fifth Edition. Sinauer Associates. California: Sunderland</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
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Module Name:	*Telaah Kurikulum Sekolah* (Curriculum Review)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103154
Abbreviation, if applicable:	Not applicable
Courses included in the module, if applicable:	Not applicable
Semester/term	III/Second Year (sophomore)
Module coordinator(s):	Dr. Elok Sudibyo, M.Pd.
Lecturer(s):	Dr. Elok Sudibyo, M.Pd. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Biology (8420103023) General Physics (8420103045) General Chemistry (8420103074) Learning Theory (8420103155) Introductory of Education Educational Psychology
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. explain information regarding the rules, implementation, and issues related to Curriculum 2013; 2. analyze the components of Curriculum 2013; 3. analyze the scope of materials of basic competencies; and 4. design student worksheet related to basic competencies of Curriculum 2013.
Content:	Framework of Curriculum 2013, semester and year learning program, learning outcomes, student worksheet design, and concept-mapping.
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><td>Total</td><td>100%</td></tr>
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</td></tr>
<tr><td>Learning Methods</td><td>student-centred approach, lecturing, group and class discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>PowerPoint slides, student worksheets, videos and book chapters.</td></tr>
<tr><td>Literature (primary references):</td><td>1. Krathwohl D R and Anderson L W 2001 A Taxonomy for Learning Teaching and Assessing: A Revision of Bloom`s Taxonomy of Educational Objectives (USA: Longman)
2. Morrison G R, Ross S M, Kalman H K, Kemp J E 2013 Designing Effective Instruction (USA: Wiley)
3. Ornestein A C and Hunkins F P 2018 Curriculum: Foundation, Principles, and Issues (Vivar, Malaysia: Pearson)
4. Badan Standar Nasional Pendidikan 2013 Permendikbud Tentang Kurikulum Tahun 2013 (Jakarta: Depdikbud)</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
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Module Name:	Kewirausahaan (*Enterpreneur*)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	
Abbreviation, if applicable:	KWU
Courses included in the module, if applicable:	Not applicable
Semester/term	III/second year (junior)
Module coordinator(s):	Siti Nurul Hidayati, S.Pd., M.Pd.
Lecturer(s):	Siti Nurul Hidayati, S.Pd., M.Pd. Laily rosdiana, S.Pd., M.Pd. An Nuril Maulida Fauziah, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (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 *sks**)
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 15 weeks per semester, 90 total hours per semester ~ 3.18 ECTS**
Credit point:	2 *sks* (3.18 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** 1. Able to take advantage of IPTEK and master theoretical concepts in the field of entrepreneurship in an effort to develop a deep entrepreneurial spirit and formulate it in procedural problem solving 2. Able to make informed decisions and data analysis and provide direction in choosing alternative solutions 3. Responsible for informing the results of analysis of information and data, both orally and in writing
Content:	Understanding the concept of entrepreneurship in an effort to develop an entrepreneurial spirit, namely the ability to motivate oneself to be able to perceive business opportunities, create services, production, marketing, partnerships and management, and be able to improve problem-solving skills in business.
Attribute Soft skill:	Team work, Good scientist, Long life education
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

Assessment Components	Percentage Contribution
Participation	20%
Assignment	30%

	<table><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table>
Learning Methods	Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning
Form of Media:	LCD, PowerPoint, hand out, e-learning
Literature (primary references):	1. Stephen R Covey, 1997. The 7 habits of highly effective people (Indonesian edition) . Bina Rupa script 2. Robert T Kyiuosaki. 2004. Rich dad, poor dad . PT SUN Jakarta 3. Hendro. MM 2011. Entrepreneurship Basics . Erlangga 4. Alexander Osterwalder. 2012. Business Model generation . Gramedia compass
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Pengelolaan Laboratorium dan Keselamatan Kerja* (Laboratory and Work Management and Safety)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103158
Abbreviation, if applicable:	Penglab
Courses included in the module, if applicable:	Not applicable
Semester/term	III/third year (junior)
Module coordinator(s):	Siti Nurul Hidayati, S.Pd., M.Pd.
Lecturer(s):	Siti Nurul Hidayati, S.Pd., M.Pd. Laily Rosdiana, S.Pd., M.Pd. Dr. Hasan Subekti, M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Physics (8420103045) General Chemistry (8420103074) General Biology (8420103023)
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Analyzing about how to use laboratory tools and managerial functions inthe laboratory; 2. Plan procedurally the construction of practical rooms in scool laboratories and their distribution; 3. Analyzing manage procedurally the implementation of pactum in school laboratories in accordance with cognitive, affective and psycomotor aspects as well as work safety; and 4. Procedurally evaluate the implementation of practicum in a laboratory based on SOP that have been made
Content:	Laboratory management and administration, work planning and costs, laboatory safety and safety, making solutions, evaluating laboratory work, and developing SOP
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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Learning Methods	Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning
Form of Media:	LCD, PowerPoint, hand out, simulation, and whiteboard and e-learning unesa (https://vinesa.unesa.ac.id/course/view.php?id=423)
Literature (primary references):	1. Bettelheim &Landesberg.2000. Laboratory Experiment for Genearal, Organics, and Biochemistry Laboratory Handbook for Teacher 2. Sri Hidayati S, 2001. Penyediaan Alat dan Bahan Praktikum. Makalah Pelatihan teknisi Laboratorium Kimia/Biologi Madrasah Allah se-jawa Timur di Madiun 3. Supriono, Sri Hidayat dan Isnawati, 2011. Pelatihan atau Pembinaan Laboran Sekolah Jatim. Handout, tidak diterbitkan
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018. ****1 sks = 1,59 ECTS**

Module Name:	*Anatomi dan Fisiologi Tumbuhan* (Plant Anatomy and Physiology)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103162
Abbreviation, if applicable:	Anfistum
Courses included in the module, if applicable:	Not applicable
Semester/term	III/second year (sophomore)
Module coordinator(s):	Enny Susiyawati, S.Si., M.Sc., M.Pd., Ph.D
Lecturer(s):	Dr. Rinie Pratiwi Puspitawati, M.Si. Enny Susiyawati, S.Si., M.Sc., M.Pd., Ph.D. Aris Rudi Purnomo, S.Si., M.Sc., M.Pd. Dhita Ayu Permata Sari, S.Pd., M.Pd. Wahyu Budi Sabtiawan, S.Si., M.Sc., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Biology (8420103023) General Chemistry (8420103074)
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. explain phenomena and processes in plant anatomy and physiology using biology and chemistry concepts. 2. Apply principles/Laws/Theories to various phenomena in plat anatomy and physiology. 3. Apply substantive concepts (principles/laws/ theories) in the field of plant anatomy and physiology in solving relevant problems. 4. Design and conduct research about plant anatomy and physiology.
Content:	Anatomy and physiology of root, stem, and leaf; diffusion and osmosis; translocation; transpiration; photosynthesis; plant respiration; and plant hormones.
Attribute Soft skill:	Discipline, collaboration, responsibility, and critical thinking.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

	Assessment Components / **Percentage Contribution** Participation — 20% Assignment — 30% Mid-semester test — 20% Final semester test — 30% **Total** — **100%**
Learning Methods	Constructivist, student-centre approach, research-based learning, lecturing, discussion, and presentation.
Form of Media:	White Board, LCD projector, Laptop, electric microscopes, internet, power point slides, and worksheet.
Literature (primary references):	1. Beck, Charles B. 2010. *An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century, 2 Edition Book*. New York: Cambridge University Press. 2. Adam, Jennifer W. Mac, 2008. *Structure and Function of Plants*. New Delhi: Willey Blackwell. 3. Taiz, L. and Zeiger E. 2010. *Plant Physiology, Fifth Edition*. Sinauer Associates. California: Sunderland.
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

SEMESTER IV

Module Name:	*Fluida* (Fluid)
Module Level:	Bachelor Degree/Undergraduate Program
Course Code:	8420103048
Abbreviation, if applicable:	Fluid
Sub-heading, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/second year (sophomore)
Module coordinator(s):	Tutut Nurita, S.Pd., M.Pd.
Lecturer(s):	Tutut Nurita S.Pd., M.Pd. Muhamad Arif Mahdiannur, S.Pd., M.Pd. Enny Susiyawati, Ph.D
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.97 ECTS**
Credit point:	3 *sks* (3.97 ECTS)
Requirements:	– General Physics (8420103045) – General Chemistry (8420103074) – General Biology (8420103023)
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. Describes the concepts and principles / laws of fluids (static, dynamic, and ideal gases); 2. Formalize procedural problem solving in fluid 3. Solve problems related to fluids and their applications in everyday life **Sub-CLOs:** 1. Explain the concepts of static fluids, dynamic fluids and ideal gases and their application in everyday life as part of the development of science and technology with the assignment to solve problems in the field of science; 2. Analyzing by solving problems procedurally the principles / laws of fluids (static, dynamic, and ideal gases) include: write down the objectives of the experiment, write down the background, formulate problems, determine hypotheses, write down experimental data, analyze experimental data by

<table>
<tr><td></td><td>connecting with the concept of fluid, conclude the results of the experiment;
3. Analyze information, data in fluid practicum and can make reports correctly</td></tr>
<tr><td>Content:</td><td>Definition of fluids, properties of fluids, pressure on solid and fluid objects, principles / laws of static fluids, specific properties of liquids, principles / laws of dynamic fluids, typical properties of gaseous fluids, and solving problems applications in the field of science such as blood pressure, diffusion in the event of respiration, osmotic pressure.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

<table><tr><th>Assessment Components</th><th>Percentage Contribution</th></tr><tr><td>Participation</td><td>20%</td></tr><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets, and e-learning Vinesa</td></tr>
<tr><td>Literature (main references):</td><td>1. Bansal, R.K.2008.A Textbook of Fluid Mechanics.Delhi : Ajit Printers, Old Maujpur.
2. Bruce, dkk. 2003. Mekanika Fluida Jilid 1 Edisi Keempat. Jakarta: Erlangga.
3. Currie, I.G. 2012.Fundamental Mechanics of Fluids, Fourth Edition. USA: CRC Press
4. Giancoli, Douglas. 2010. Fisika I. Jakarta: Erlangga.
5. Giordano, Nicholas J. 2010. College Physics: Reasoning and Relationships, First Edition. Canada: Nelson Education, Ltd..</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
</table>

Module Name:	*Konservasi Sumber Daya Alam dan Lingkungan* Conservation of Natural Resources and Environment
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420102078
Abbreviation, if applicable:	KSDAL
Courses included in the module, if applicable:	Not applicable
Semester/term	IV
Module coordinator(s):	Ahmad Qpsyim, S.Si.M.Pd
Lecturer(s):	Dra. Wisanti, M.S. Dr. Sunu Kuntjoro, M.Si. Ahmad Qosyim, S.Si., M.Pd
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	2 x 50 minutes lectures, 3 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.18 ECTS**
Credit point:	2 *sks* (3.18 ECTS)
Requirements:	General Biology KMH
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Have mastery of conservation principles, natural resources, and the environment 2. Mastering the concept of KSDAL application and relevant technology in the management of natural resources and the environment 3. Able to solve problems in the community in an effort to apply knowledge of KSDAL 4. Able to realize independent character, and care for the environment through KSDAL lectures to develop ecopreneurship Sub CLO 1. Propose creative ideas in solving environmental problems in general, by understanding the scope of conservation which includes: background, definition, goals, benefits and efforts to conserve natural resources and the environment (SDAL) 2. Propose creative ideas in solving environmental problems in general, by understanding efforts to conserve natural resources and the environment (SDAL)

	3. Applying the principles of environmental ethics in life, by understanding environmental ethics which include: Definition, Paradigm, and Environmental Ethical Principles. 4. Develop ideas that are effective in overcoming natural resources and environmental problems. 5. Developing systematic ideas to preserve local wisdom of the community 6. Develop ideas that are effective in accordance with the principles of natural resource management and the environment 7. Understand the principles of conservation globally and locally. 8. Take an active role in the Unesa eco campus movement 9. Take an active role in efforts to overcome the environment in the area of origin through conservation activities. 1. Mengusulkan gagasan kreatif dalam memecahkan masalah lingkungan secara umum, dg memahami Ruang lingkup konservasi yang meliputi: Latar belakang, Pengertian, tujuan, manfaat dan upaya-upaya konservasi sumber daya alam dan lingkungan (SDAL) 2. Mengusulkan gagasan kreatif dalam memecahkan masalah lingkungan secara umum, dengan memahami Upaya-upaya konservasi sumber daya alam dan lingkungan (SDAL) 3. Menerapkan prinsip-prinsip etika lingkungan dalam kehidupan, dengan memahami Etika lingkungan yang meliputi: Pengertian, Paradigma, dan Prinsip-prinsip Etika Lingkungan. 4. Mengembang-kan gagasan yang efektif untuk mengatasi permasalahan SDA dan lingkungan. 5. Mengembang-kan gagasan yang sistematis untuk melestarikan kearifan lokal masyarakat 6. Mengembang-kan gagasan yang efektif sesuai dengan prinsip pengelolaan SDA dan lingkungan 7. Memahami prinsip-prinsip konservasi secara global dan lokal. 8. Berperan aktif dalam gerakan *eco campus* Unesa 9. Berperan aktif dalam usaha mengatasi lingkungan di daerah asal melalui kegiatan konservasi.
Content:	Discusses: 1) The scope of conservation which includes: Definition, objectives, benefits and efforts to conserve natural resources and the environment (SDAL); 2) Environmental ethics which includes: Definition, Paradigm, and Environmental Ethical Principles; 3) Natural resources which include: Definition, types and benefits of Natural Resources; 4) Local wisdom which includes: Definition, approach, challenges and local wisdom in people's lives in

<table>
<tr><td></td><td>the future; 5) Management and problems of natural resources and the environment which include: issues, problems and management of natural resources and the environment; 6) Awareness of conservation which includes awareness of the importance of conserving natural resources and the environment, an eco campus and a conservation campus. Lecture activities are carried out in a student center with discussions, observations, project assignments, and presentations by developing ecopreneurship characteristics.

Membahas tentang: 1) Ruang lingkup konservasi yang meliputi: Pengertian, tujuan, manfaat dan upaya-upaya konservasi sumber daya alam dan lingkungan (SDAL); 2) Etika lingkungan yang meliputi: Pengertian, Paradigma, dan Prinsip-prinsip Etika Lingkungan; 3) Sumber daya alam yang meliputi: Pengertian, jenis-jenis dan manfaat Sumber Daya Alam; 4) Kearifan lokal yang meliputi: Pengertian, pendekatan, tantangan dan kearifan lokal dalam kehidupan masyarakat di masa yang akan datang; 5) Pengelolaan dan permasalahan sumber daya alam dan lingkungan yang meliputi: isu-isu, permasalahan dan pengelolaan sumber daya alam dan lingkungan; 6) Sadar konservasi yang meliputi, kesadaran pentingnya konservasi sumber daya alam dan lingkungan, eco campus dan kampus konservasi. Kegiatan perkuliahan dilakukan secara student center dengan diskusi, observasi, tugas proyek, dan presentasi dengan mengembangkan karakteristik ecopreneurship.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centred approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets,</td></tr>
<tr><td>Literature (primary references):</td><td>1. Cluras, D. D. and Reganold, J.P. 2010. Natural Resources Conservation Future. Washington:</td></tr>
</table>

	Washington State University. 2. Hamzah, S. 2010. *Pendidikan Lingkungan. Sekelumit Wawasan Pengantar*. Bandung: PT RefikaAditama. 3. Indrawan, M; Primack, R.B; Supriatna, J. 2007. *Biologi Konservasi*. Jakarta: Yayasan Obor Indonesia. 4. Iskandar, Z.I. 2012. *Psikologi Lingkungan. Teori dan Konsep*. Bandung: PT Refika Aditama. 5. Keraf, A.S. 2010. *Etika Lingkungan Hidup*. Jakarta: Penerbit BukuKompas. 6. Marfai, M.A. 2013. *Pengantar Etika Lingkungan dan Karifan Lokal*. Yogyakarta: Gadjah Mada University Press. 7. Mitchell, B; Setiawan, B; Rahmi, D.H. *Pengelolaan Sumber daya dan Lingkungan. Yogyakarta*: Gadjah Mada University Press. 8. Suparmoko, M. 2013. *Ekonomi Sumber Daya Alam dan Lingkungan. Suatu Pendekatan Teoritis*. Yogyakarta: BPF. 9. Van Dyke, F. 1993. *Conservation Biology*. Boston: University of Arkansas, Inc.
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Pembelajaran Inovatif 1* (Innovative Learning 1)
Module Level:	Bachelor Degree/Undergraduate Program
Course Code:	8420103107
Abbreviation, if applicable:	PI 1
Sub-heading, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/second year (sophomore)
Module coordinator(s):	Tutut Nurita, S.Pd., M.Pd.
Lecturer(s):	Prof. Dr. Erman., M.Pd. Laily Rosdiana, S.Pd., M.Pd. An Nuril MF, S.Pd., M.Pd. Enny Susiyawati, Ph.D
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.97 ECTS**
Credit point:	3 *sks* (3.97 ECTS)
Requirements:	– Educational Psychology (8420102183) – Introductory of Natural Science (8420102028) – Learning Theory (8420103155) – History and Philosophy of Science Education (8420102159) – Management and Safety Work in Laboratory (8420103161)
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. Apply knowledge about the characteristics of innovative learning models 1 2. Apply pedagogical knowledge in designing, implementing, and evaluating integrated science learning 3. Designing, implementing and evaluating learning by utilizing ICT to support the implementation of innovative learning 1 **Sub-CLOs:** 1. Apply knowledge about the characteristics of learning models including concept acquisition, meaningful verbal learning, direct instruction, discussion, SET;

<table>
<tr><td></td><td>2. Planning, implementing and evaluating learning by utilizing ICT to support the implementation of innovative learning including Concept Acquisition Learning Models, Meaningful Verbal Learning, Direct Instruction, discussions, SET (Science Environment and Technology) and strategies to achieve student competence;
3. Implementing learning management using relevant learning models (Concept Acquisition Learning Model, Meaningful Verbal Learning, Direct Instruction, discussion, SET) according to the learning styles of students;
4. Make decisions in designing and using laboratory equipment, learning resources, and science and technology-based learning media and contexts to support the implementation of innovative learning including Concept Acquisition Learning Models, Meaningful Verbal Learning, Direct Instruction Learning, discussions, SET according to competence, characteristics of the subject matter, and characteristics of students</td></tr>
<tr><td>Content:</td><td>Acquisition of concepts, meaningful verbal learning, direct instruction, discussion, SET, learning management</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
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<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets, simulation, and e-learning Vinesa</td></tr>
<tr><td>Literature (main references):</td><td>1. Arends, Richard I.2012. Learning To Teach sixth Edition. New York: McGraw-Hill Book Company
2. Arends, Richard I. 2004.Guide to Field Experiences and Portofolio Development: to accompany ;learning to teach. New York: McGraw-Hill Book Company.
3. Ibrahim, Muslimin, Rachmadiarti, Fida, Ismono. 2005.Pembelajaran Kooperatif.Surabaya: Pusat Sains dan Matematika Sekolah.
4. Ibrahim, Muslimin.2012. Konsep, Miskonsepsi, dan Cara Pembelajarannya. Surabaya: University Press</td></tr>
</table>

	5. Nur, Mohamad. 2000. Strategi-strategi Belajar. Surabaya: Pusat Sains dan Matematika Sekolah 6. Nur, Mohamad, Kardi Soeparman. Pembelajaran langsung. Surabaya: Pusat Sains dan Matematika Sekolah
Notes:	*__1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)__ according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**__1 sks = 1,59 ECTS__

Module Name:	*Dasar-dasar Biokimia* (Introductory of Biochemistry)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103163
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/second year (sophomore)
Module coordinator(s):	Prof. Dr. Erman, M.Pd.
Lecturer(s):	Prof. Dr. Erman, M.Pd. Dra. Martini, M.Pd. Siti Nurul Hidayati, S.Pd., M.Pd. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	– General Chemistry
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Utilizing science and technology to understand the role of nutrients as an energy source; 2. Mastering the structure, function, and biochemical reactions of nutrients; 3. Be able to write down ideas for preventing metabolic disorders.
Content:	Structure and function of carbohydrates, lipids and proteins; The chemical composition of the protoplasm; Energy metabolism; Carbohydrate metabolism; Lipid metabolism; and Protein metabolism.
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

	<table><tr><th>Assessment Components</th><th>Percentage Contribution</th></tr><tr><td>Participation</td><td>20%</td></tr><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table>
Learning Methods	Problem-based learning, lecturing, discussion, and presentation (structured activities).
Form of Media:	LCD, PowerPoint slides, worksheets.
Literature (primary references):	1. Cambpbell. M.K. 1999.Biochemistry(3rd Ed). Harcourt College Publisher Foreworth. 2. Erman. 2007. Dasar-dasar Biokimia Olahraga. Surabaya: Unesa University Press. 3. Mathew. C.K. Van Holde. K.E.A.Hem, K.G. 2000.Biochemistry (3rd). San Fransisco: Longman Inc. 4. Stryer. L. 1996. Biokimia (ed 4). Jakarta: Penerbit Buku Kedokteran EGC. 5. Yohanes Ngili. 2010. Biokomia Dasar. Bandung: Rekayasa Sains.
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Media Pembelajaran* Learning Media
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103090
Abbreviation, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	4/ second year (sophomore)
Module coordinator(s):	Hasan Subekti
Lecturer(s):	Hasan Subekti Wahyu Budi Sabtiawan Ernita Vika Aulia
Language:	Bahasa Indonesia (Indonesian language)
Classification within the curriculum:	Compulsory Course/ ~~Elective Studie~~s
Teaching format/class hours per week during the semester:	2 contact hours of lecturer (Indonesia credit semester or sks*)
Workload:	2 x 50 minutes lectures, 2 x 60 minute structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79.34 total hours per semester ~ 2.64 ECTS**
Credit point:	2 sks (2.64 ECT)
Requirements:	- Learning Theory - The Foundation of Learning - Computer Basics
Learning goals/competencies:	**General Competencies (Knowledge):** Students can explain the definition, types/classifications, functions, fundamentals of media development, and can choose, design, and produce learning media by utilizing the surrounding environment (contextual) and ICT. **Specific Competence:** 1. Integrate ICT in science learning as a source and learning medium and use it to support the implementation of learning. 2. Mastering the understanding, types/classifications, functions, and basics of developing instructional media. 3. Designing, selecting and producing science learning media by utilizing the surrounding environment (contextual) and / or ICT-based. 4. Have a responsible attitude in developing science learning media that are practical, efficient and safe for students.
Content:	Introduction to learning media, development of simple science teaching aids models, instructional learning media (Power Point), shooting and editing movie, facebook learning media, website and webblog learning media,

<table>
<tr><td></td><td>animation media.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>University students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on following weight:
<table>
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<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Learning Methods</td><td>Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint, hand out, simulation, e-learning Vinesa, and whiteboard</td></tr>
<tr><td>Literature:</td><td>1. Fenrich, Peter. 1997. Practical Guidelines For Creating Instructional: Multimedia Application. San Diego, USA: The Dryden Press.
2. Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. 1999. Instructional media and technologies for learning. Upper Saddle River, NJ: Prentice-Hall.
3. Isnawati, Supriono, dan Hasan Subekti. 2013. Rampai Media Pembelajaran Sains Inovatif. Surabaya: Jaudar Press.
4. Smadino, Sharon E., Debora L. Lowter, James D. Russell. 2011. Instructional Technology & media for Learning (Teknologi Pembelajaran dan Media untuk Belajar). Jakarta: Kencana Prenada Media Group.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
</table>

Module Name:	*PLP I* (Internship I)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420102142
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/second year (sophomore)
Module coordinator(s):	LPPPM Universitas Negeri Surabaya
Lecturer(s):	Team
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	1 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	1 x 170 minutes activities, 14 weeks per semester, 39.67 total hours per semester ~ 3.18 ECTS**
Credit point:	1 *sks* (3.18 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Describe the general characteristics of students who will later become responsible for educational praxis; 2. Describe the organizational structure and work procedures of the school; 3. Describe school rules and regulations; 4. Identify formal-ceremonial activities in schools; 5. Identify routine activities in the form of curricular, co-curricular and extracurricular activities; and 6. Describe the practices of positive habits and habits in schools.
Content:	This course provides an understanding of the concept of general characteristics of students who will later become responsible for educational praxis, school organizational structure and work procedures, school rules and regulations, formal ceremonial activities in schools, routine curricular activities, co-curricular and extracurricular activities, and positive practices and habits in schools.
Attribute Soft skill:	Collaboration, responsibility, honesty, and hard work.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

Assessment Components	Percentage Contribution
Participation	20%

	<table><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table>
Learning Methods	Discussion, project-based learning and presentation (structured activities)
Form of Media:	LCD, PowerPoint slides, and virtual learning platform
Literature (primary references):	1. Arend, R.I., 2012. *Learning to Teach*. New York: Mc Grow-Hill International Edition. 2. Hyland, Ken., & Wong, Lilian L. C. 2016. *Innovation and Cange in English Language Education*. London: Ruthledge. 3. Muliawan, Jasa Ungguh. 2017. *45 Model Pembelajaran Spektakuler*. Jogjakarta: AR-Ruzz Media. 4. Mulyasa, E., 2004. *Manajemen Berbasis Sekolah: Konsep, Strategi, dan Implementasi*. Bandung: Remaja Rosdakarya. 5. Sani, Ridwan Abdullah. 2016. *Inovasi Pembelajaran*. Jakarta: Bumi Aksara. 6. Taniredja, Tukiran dkk. 2015. *Model-Model Pembelajaran Inovatif dan Efektif*. Bandung: Alfabeta. 7. Wena, Made. 2016. *Strategi Pembelajaran Inovatif Kontemporer: Suatu Tinjauan Konseptual Operasional*. Jakarta: Bumi Aksara.
Notes:	*__1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)__ according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**__1 sks = 1,59 ECTS__

Module Name:	*Anatomi dan Fisiologi Hewan* (Animal Anatomy and Physiology)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103167
Abbreviation, if applicable:	Not applicable
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/Second Year (sophomore)
Module coordinator(s):	Dr. Nur Ducha, M.Si.
Lecturer(s):	Dr. Nur Ducha, M.Si. Enny Susiyawati, Ph.D. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc. Dhita Ayu Permata Sari, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Biology (8420103023) General Chemistry (8420103074) General Physics (8420103045)
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Describe anatomical and physiological network among different system in animal and human body 2. Explain the phenomena related to animal anatomy and physiology using ICT 3. Demonstrate decision making skills during laboratory activity
Content:	The systems in animal and human body, namely, cardiovascular system, respiratory system, skeletal and muscular system, nervous system, digestive system, osmoregulatory system, endocrine system, reproductive system, and embryology
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

Assessment Components	Percentage Contribution
Participation	20%

	<table><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table>
Learning Methods	student-centred approach, lecturing, group and class discussion, lab work investigation, and presentation (structured activities), and flip learning
Form of Media:	PowerPoint slides, student worksheets, videos, virtual laboratory, and preserved organs
Literature (primary references):	- Kardong, K. V. (2012). *Vertebrates: Comparative Anatomy, Function, and Evolution*. New York: McGraw-Hill. - Knobbil & Neill's. (2015). *Physiology of Reproduction*. 4th Edition. Plant & Zeleznik (Eds). Oxford: Elsevier. - Kay, I. (1998). *Introduction to Animal Physiology*. Manchester: Bios Scientific Publisher. - Sherwood, Klandorf, & Yancey. (2013). *Animal Physiology: from Genes to Organisms*. Belmont, USA: Brooks/Cole. - Tortora & Derrickson. (2012). *Principles of Anatomy and Physiology*. 13th Edition. USA: John Wiley & Sons, Inc. - Hill, Wyse, & Anderson. (2012). *Animal Physiology*. 3rd Edition. Massachusetts: Sinauer Associate Inc. - Gilbert, S. F. (2010). *Developmental Biology*. 9th Edition. Massachusetts: Sinauer Associate Inc. - Ellie, J. (2011). *Visualizing Human Biology*: *Lab Manual*. USA: John Wiley & Sons, Inc. - Treuting & Dintzis (Eds). (2012). *Comparative Anatomy and Histology: A Mouse and Human Atlas*. San Francisco: Elsevier. - Rappole, J. H. (2013). *The Avian Migrant: The Biology of Bird Migration*. New York: Columbia University Press. - Wood & Kellermann (Eds). (2015). *Phenological Synchrony and Bird Migration: Changing Climate and Seasonal Resources in North America*. London: CRC Press. - Ladich (Ed). (2015). *Sound Communication in Fishes*. Dordrecht: Springer.
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Asesmen Proses dan Hasil Belajar* (Assessment and Evaluation)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103010
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not applicable
Semester/term	IV/second year (sophomore)
Module coordinator(s):	Dr. Elok Sudibyo, M.Pd.
Lecturer(s):	Beni Setiawan, S.Pd., M.Pd. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc. Dhita Ayu Permata Sari, S.Pd., M.Pd. Aris Rudi Purnomo, S.Si., M.Sc., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	Curiculum Review, Learning Theory, and Basic Computer
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Understand the concepts and principles of assessment process and learning outcomes including terminology and understanding, taxonomy of learning outcomes, assessment principles, assessment strategies and forms, development steps, assessment instrument quality criteria, item analysis, and interpretation of assessment results; and 2. Design instruments to assess the affective, cognitive, and psychomotor domain learning processes and outcomes that are adequate with learning indicators.
Content:	Principles and Theory of Assessment, Validity and Reliability, and Assessment Design
Attribute Soft skill:	Collaboration, communication, and argumentation in the natural classroom setting.
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

Assessment Components	Percentage Contribution
Participation	20%

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<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Learning Methods</td><td>Discussion, project-based learning, presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, and virtual learning platform</td></tr>
<tr><td>Literature (primary references):</td><td>1. MacMohan M, Simmons P, Sommers R, DeBaets D, and Crawley F. 2006. Assessment in Science: Practical Experiences and Education Research. USA: NSTA Press.
2. Brookhart, Susan M. 2010. How to assess higher-order thinking skills in your classroom. Alexandria: ASCD.
3. Pusat Analisis dan Sinkronisasi Kebijakan. 2018. Panduan Praktis Implementasi Penguatan Pendidikan Karakter (PKK) Berbasis Budaya Sekolah. Jakarta: PASKA.
4. Krathwohl, D.R., 2002. A revision of Bloom's taxonomy: An overview. Theory into practice, 41(4), pp.212-218.
5. Tim Pembelajaran dan Kurikulum Direktorat Pembinaan Sekolah Menengah Pertama. 2016. Modul Pengembangan Instrumen Penilaian oleh Pendidik Mata Pelajaran Ilmu Pengetahuan Alam Sekolah Menengah Pertama. Jakarta: Kemendikbud.
6. Direktorat Pembinaan Sekolah Menengah Pertama. 2017. Panduan Penilaian oleh Pendidik dan Satuan Pendidikan untuk Sekolah Menengah Pertama. Jakarta: Kemendikbud.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
</table>

SEMESTER V

Module Name:	*Kelistrikan dan Kemagnetan* Electricity and Magnetism
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103068
Abbreviation, if applicable:	KK
Courses included in the module, if applicable:	Not applicable
Semester/term	5 / fourth year (senior)
Module coordinator(s):	Mohammad Budiyanto
Lecturer(s):	An Nuril Maulida F Eny Susiyawati M. Arif Mahdiannur
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Physic
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Tracing data and information about electricity and magnetism and its use in everyday life 2. Analyzing the symptoms of static electricity in objects and living things and their application by utilizing science and technology 3. Analyzing the symptoms of dynamic electricity in objects and living things and their application by utilizing science and technology 4. Analyzing the symptoms of magnetism, magnetic induction, and electromagnetic induction in living things and living things and their application by utilizing science and technology 5. Analyzing resistance, inductors and capacitors in alternating current circuits
Content:	Electric and magnetic properties, electric charge, Coulomb's Law, electric field strength, Gauss's law, Electric Potential, Capacitance capacitors, symptoms of static electricity in objects and living things, direct electrical circuits, Kirchoff's Law, dynamic electrical symptoms in objects and living things, magnetic and electromagnetic induction, symptoms of magnetism in living things and being, symptoms of

<table>
<tr><td></td><td>magnetic and electromagnetic induction in living things and being, RC and RL circuits, Resistance and capacitance, and current and voltage in AC circuits</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

<table><tr><th>Assessment Components</th><th>Percentage Contribution</th></tr><tr><td>Participation</td><td>20%</td></tr><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Learning Methods</td><td>Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint, hand out, simulation, e-learning Vinesa, and whiteboard</td></tr>
<tr><td>Literature (primary references):</td><td>1. Halliday & Resnick. 2013. Fundamental of Physics, 10th Edition. John Wiley & Sons Inc.
2. Giancoli, Douglas. 2016. Physics: Principles with Applications II Global Edition. California: Addison-Wesley.
3. Young, Hugh D., Freedman, Roger A., Ford, Albert Lewis. 2016. Sears and Zemansky's University Physics: With Modern Physics. Pearson.</td></tr>
<tr><td>Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td></td><td>**1 sks = 1,59 ECTS</td></tr>
</table>

Module Name:	Live at Cellular Level *Kehidupan Tingkat Sel*
Module Level:	Bachelor Degree/Undergraduate Program
Course Code:	8420103067
Abbreviation, if applicable:	KTS
Sub-heading, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	VII/fourth year (senior)
Module coordinator(s):	Ahmad Qosyim, S.Si., M.Pd.
Lecturer(s):	Prof. Dr. Erman, M.Pd. Ahmad Qosyim, S.Si., M.Pd. Guntur Tri Mulyono, S.Si., M.Si.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	– General Biology (Code: 8420103023) – General Chemistry (Code: 8420103074) – Introduction to Biochemistry (Code: 8420103163)
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. **Using science and technology to explore data and information** (principles / laws / theories) to explain cells and the processes that occur in them and to solve problems related to life at the cellular level. 2. **Explain the concepts, principles, and cell theory, including**: structure and function of cells and cell organelles, structure and function of the plasma membrane, biological structure and function of proteins and nucleic acids, mechanisms of protein synthesis, cell growth and proliferation, materials and reactions chemistry that supports the role of function and supports the structure of cell organelles, as well as differentiation and determination used to formulate alternative solutions to relevant problems. 3. Make strategic decisions based on the analysis of information and data relating to life at the cellular level in the context of being a science teacher candidate. 4. Able to work independently, work together in

<table>
<tr><td></td><td>collaborative teams, show a responsible attitude for both individual and team assignments, and communicate ideas, opinions and arguments orally / in writing

Sub-CLOs:
1. Search the literature from various sources / ICT for cell concepts, principles, and theory
2. Describe the structure and function of cells and their organelles
3. Describe the structure and function of cells and their organelles
4. Identifying the factors that influence cell-level life in terms of components, structure, composition, biochemical processes and functions of each cell organelle either independently or in groups
5. Describe various disorders of cell function and their causes as well as efforts to overcome problems of life at the cellular level
6. Describe the process of protein synthesis, cell growth and proliferation and the factors that influence it
7. Describe the process of protein synthesis, cell growth and proliferation and the factors that influence it</td></tr>
<tr><td>Content:</td><td>The study of life at the cellular level includes the structure, function and biochemical processes in each cell organelle, including the biological function of proteins and nucleic acids, protein synthesis mechanisms, cell growth and proliferation, materials and chemical reactions that support the role, function, and structure. cell organelles and differentiation and determination which are carried out through theoretical studies and discussions.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
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<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets</td></tr>
<tr><td>Literature (main references):</td><td>1. Gatot, Suparno, Djoko Budiono, dan Sri Kencananingsih. 2014. Handout Kehidupan Tingkat Sel. Unesa.</td></tr>
</table>

	2. Karp, Gerald. 2010. *Cell Biology 6th Edition International Student Version*. Wiley & Sons. 3. Wong, EV. 2009. *Cells: Molecules and Mechanisms*. Louisville: Axolotl Academic Publishing Company. 4. Sheeler, P. and D.E. Bianchi. 1987. *Cell and Molecular Biology*. Canada: John Wiley & Sons. 5. Thorpe, N.O. 1984. *Cell Biology*. New York: John Wiley & Sons. 6. Albert, B., et al. 1983. *Molleculer Biology of The Cell*. New York: Garland Publishing Inc.
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Metodologi Penelitian* (Research Methodology)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103094
Abbreviation, if applicable:	Metpen
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year (junior)
Module coordinator(s):	Dr. Wahono Widodo, M.Si.
Lecturer(s):	Dr. Wahono Widodo, M.Si. Dr. Elok Sudibyo, M.Pd. Siti Nurul Hidayati, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	-
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Apply research methods to solve educational problems according to related fields of study; 2. Master the concepts of educational research including research paradigms, types of research, studies of current research articles, variables, research designs, research instruments, research techniques, data analysis and interpretation of research results, as well as steps for preparing proposals. and research reports; 3. Have skills in compiling educational research proposals according to the field of study; and 4. Having a responsible attitude towards the process and results of the research that has been done.
Content:	This course examines research paradigms, research approaches, types of research, studies of recent research articles, hypotheses, variables, research designs, research instruments, research techniques, data analysis and interpretation of research results, as well as steps for preparing proposals and research report. This course is presented in theory and an assignment for the preparation

<table>
<tr><td></td><td>of an educational research proposal as the final product of the course.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><td>Learning Methods:</td><td>Constructivist, student-centred approach, lecturing, discussion, and presentation (structured activities)</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, and worksheets</td></tr>
<tr><td>Literature (primary references):</td><td>1. Creswell, J.W. 2008. Educational Research: Planning, Conducting, and Evaluating Quantitative Research. 3rd Edition. New Jersey: Pearson Prentice Hall.
2. Fraenkel, J.R., Wallen, N.E., Hyun, H. H. 2012. How to Design and Evaluate Research in Education. New York: McGraw-Hill Companies, Inc.
3. Cohen, Louis., Manion, Lawrence., Morrison, Keith. 2007. Research Methods in Education. Sixth Edition. New York: Routledge.
4. Tim Kurikulum Unesa. 2014. Pedoman Panduan Penulisan Skripsi Mahasiswa S-1.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
</table>

Module Name:	*Ekologi* Ecology
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103033
Abbreviation, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year (junior)
Module coordinator(s):	Ahmad Qosyim, S.Si., M.Pd
Lecturer(s):	Prof. Dr. Fida Rahmadiarti, M.Kes. Dra. Herlina Fitrihidajati, M.Si. Dr. Tarsan Purnomo, M.Si. Dr. Hasan Subekti, M.Pd. Ahmad Qosyim, S.Si., M.Pd
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	General Biology (8420103023)
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Mastering the basic concepts of Ecology science about the principles and concepts of ecosystems 2. Utilizing Information and communications technology (ICT) to communicate ideas, ideas and findings in Ecological concepts 3. Make strategic decisions based on the data and information that has been done, to apply the concepts of theory and practice 4. Able to work independently, work together in collaborative teams **Sub-CLO:** 1. Introduction: Scope of Ecology: Relationship of Ecology with other sciences, Division of Ecology, Units of living things in ecosystems 2. Principles and Concept of Ecosystem: Concept of ecosystem, concept of productivity 3. Principles and Concepts of Energy: Basic concepts of energy, Concept of productivity 4. The process of eating eating: food chains, food webs, relationships

<table>
<tr><td></td><td>of metabolism and individual size, trophic structures and ecological pyramids
5. Principles and Concepts of the biogeochemical cycle: Types and basic patterns of biogeochemistry, sediment cycle, organic nutrient cycle
6. Limiting Factors: Liebig's Minimum Law, Shelford's Law of Tolerance, Physical-Chemical Factors as Limiting factors, Ecological Indicators
7. Community: the concept of community, intra-community classification, diversity of species, patterns in the community, ecotone
8. Population growth, interaction and regulation: Basic concept of population, characteristics of population, population growth, basic concept of population rate, population interaction, environmental carrying capacity
9. Species and Individuals: Concept of species, Habitat, Ecological niche, Speciation and Adaptation
10. Eco-energetics and ecosystem development: Energy flows, dispersion, aggregation, isolation and territoriality, group selection, the concept of climax, ecosystem development
11. Biome: Terrestrial environment, vegetation, types of biomes
12. Conservation History</td></tr>
<tr><td>Content:</td><td>Understand, and communicate the basic concepts of Ecology regarding: understanding and application of the principles and concepts of individuals, populations, communities, ecosystems; vegetation: productivity, succession, environmental factors, biomes, tropical terrestrial vegetation; tolerance range, time-temperature concept, feeding-eating relationships, ecological niches, growth parameters, interaction and regulation, population interaction and regulation, and conservation. Presented in the form of theory and practice.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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</td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets,</td></tr>
<tr><td>Literature (primary references):</td><td>1. Campbell, N. A. et al. (2008). Biology; Eighth Edition. San Fransisco: Pearson, Benjamin Cummings.
2. Van der Maarel, Eddy. Ed. 2005. Vegetation Ecology. Printed and bound in the United Kingdom. by Blakwell Science Ltd a Black Well Publising Company.</td></tr>
</table>

	3. Myers, Judith H. and Bazely Dawn R. 2003. *Ecology and Control of Introduced Plants*. The Edinburgh Building, Cambrige CB2 2RU, United Kingdom. Cambridge Universty Press. 4. Mayhew, Peter J. 2006. *Discovering Evolutionary Ecology*. Published in the United States; by Oxford University Press Inc., New York. 5. Mackenzie, A. A.S. Bali & S.R. Virdee. 1998. *Instant Note In Ecology*. Singapore: Bios Scientific Publishers Ltd. 6. Spellerberg, lan,F. Longman. 1998. *Conservation Biology*. Singapore Publishers Ltd. 7. Gough, A. (2004). Achieving "Sustainability Education" in Primary Schools as a Result of the Victorian Science in Schools Research Project. *Australian Journal of Environmental Education, Vol. 20*(2). 8. Gough, A., & Sharpley, B. (2005). *Education for a sustainable future: A National Environmental Education Statement for Australia school.* Diambil dari http://www.environment.gov.au/education/publications/pubs/national-action -plan.pdf
Notes:	***1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)** according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	****1 sks = 1,59 ECTS**

Module Name:	*Larutan* (Solution)
Module Level:	Bachelor degree/Undergraduate Program
Course Code:	
Abbreviation, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year
Module coordinator(s):	Dr. Wahono Widodo, M.Si.
Lecturer(s):	Dr. Wahono Widodo, M.Si. SitiNurulHidayati, S.Pd., M.Pd. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc. Ernita Vika Aulia, S.Pd., M.Pd.
Language:	*Bahasa Indonesia* (Indonesian)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.97 ECTS**
Credit point:	3 *sks* (3.97 ECTS)
Requirements:	
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. Apply the concept of solution, solution concentration, and colloid as the basis for solving problems in everyday life. 2. Apply the colligative nature of the solution and Raoult's law in order to solve relevant problems in everyday life 3. Apply the electrical properties of solutions in everyday life 4. Analyze acid-base, buffer solution, and hydrolysis in order to solve relevant problems in everyday life 5. Have responsible attitude in investigating / experimenting the properties of solutions 6. Willing to think critically in discussions and investigations / experiments on the properties of solutions
Content:	The concept of solution, solution concentration, colloid,colligative properties, acid-base, buffer, colligative,

<table>
<tr><td></td><td>and the electrical properties of the solution</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>University students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on following weight:
<table>
<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets, laboratory equipments and substances, and e-learning Unesa: (https://vi-learn.unesa.ac.id/course/view.php?id=3590)</td></tr>
<tr><td>Literature (main references):</td><td>1. Atkins, S.P.W. 1995. Physical Chemistry. Oxford: ELBS Oxford University Press.
2. Barrow Gordon M. 1996.Physical Chemistry.Sixth edition. New York : Mc Graw-Hill.
3. HiskiaAchmad. 2001. Kimia Larutan. Bandung: Citra Aditya Bakti
4. Merril, 1995.Chemistry. New York Colombus Ohio California: Glencao Mc Graw Hill.
5. Soren Prip Beier & Peter Dybdallhede. 2010. Essential of Chemistry 2nd edition. Ventus Publishing.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity or independent learning (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**Total ECTS = (total hours workload)/ 30 hours
30 study hours = 1 ECTS credit point</td></tr>
</table>

Module Name:	*Pembelajaran Inovatif 2* (Innovative Learning 2)
Module Level:	Bachelor Degree/Undergraduate Program
Course Code:	8420103109
Abbreviation, if applicable:	PI 2
Sub-heading, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year (junior)
Module coordinator(s):	Tutut Nurita, S.Pd., M.Pd.
Lecturer(s):	Prof. Dr. Erman., M.Pd. Laily Rosdiana, S.Pd., M.Pd. An Nuril MF, S.Pd., M.Pd. Enny Susiyawati, Ph.D
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory Course / ~~Elective Studies~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 3.97 ECTS**
Credit point:	3 *sks* (3.97 ECTS)
Requirements:	– Innovative Learning 1(8420103107) – Learning Media (8420103090) – Assesment and Evaluation (8420103010)
Learning goals/competencies:	**Course Learning Outcomes (CLO):** After taking this course, university students have ability to; 1. Apply knowledge about the characteristics of innovative learning models 2 2. Apply pedagogical knowledge in designing, implementing, and evaluating integrated science learning 3. Designing, implementing and evaluating learning by utilizing ICT to support the implementation of innovative learning 2 **Sub-CLOs:** 1. Apply knowledge about the characteristics of learning models including cooperative learning, problem-based learning, inquiry learning, discovery learning, contextual learning and project-based learning; 2. Planning, implementing and evaluating learning by utilizing ICT to support the implementation of innovative learning including cooperative learning,

<table>
<tr><td></td><td>problem-based learning, inquiry learning, discovery learning, contextual learning and project-based learning and strategies to achieve student competence;
3. Implementing learning management using relevant cooperative learning, problem-based learning, inquiry learning, discovery learning, contextual learning and project-based learning according to the learning styles of students;
4. Make decisions in designing and using laboratory equipment, learning resources, and science and technology-based learning media and contexts to support the implementation of innovative learning including cooperative learning, problem-based learning, inquiry learning, discovery learning, contextual learning and project-based learning according to competence, characteristics of the subject matter, and characteristics of students</td></tr>
<tr><td>Content:</td><td>cooperative learning, problem-based learning, inquiry learning, discovery learning, contextual learning and project-based learning</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on the following weight:

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<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Learning Methods</td><td>Constructivism, student-centered approach, project-based learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets, simulation, and e-learning Vinesa</td></tr>
<tr><td>Literature (main references):</td><td>1. Arends, Richard I.2012. Learning To Teach sixth Edition. New York: McGraw-Hill Book Company
2. Arends, Richard I. 2004.Guide to Field Experiences and Portofolio Development: to accompany ;learning to teach. New York: McGraw-Hill Book Company.
3. Ibrahim, Muslimin, Rachmadiarti, Fida, Ismono. 2005.Pembelajaran Kooperatif.Surabaya: Pusat Sains dan Matematika Sekolah.
4. Ibrahim, Muslimin.2012. Konsep, Miskonsepsi, dan Cara Pembelajarannya. Surabaya: University Press
5. Nur, Mohamad. 2000. Strategi-strategi Belajar. Surabaya: Pusat Sains dan Matematika Sekolah</td></tr>
</table>

Notes:	*__1 *sks* in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes)__ according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**__1 sks = 1,59 ECTS__

Module Name:	*Sains, Lingkungan, Teknologi, Masyarakat* (Science, Environment, Technology, and Society)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103138
Abbreviation, if applicable:	SETS
Courses included in the module, if applicable:	Not applicable
Semester/term	V/third year (junior)
Module coordinator(s):	Dra. Martini, M.Pd.
Lecturer(s):	Dra. Martini, M.Pd. Laily Rosdiana, S.Pd., M.Pd. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	Compulsory / ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or *sks**)
Workload:	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	– General Chemistry – General Physics – General Biology
Learning goals/competencies:	**Course Learning Outcomes (CLOs):** After taking this course, students will be able to: 1. Identify issues related to environmental problems; 2. Mastering scientific concepts to choose solutions related to environmental problems; 3. Write environmental problems solving ideas in the form of a proposal; and 4. Work collaboratively to implement environmental problems solving ideal and write report.
Content:	The role of students in environmental management; waste management; technology that converts waste into alternative energy sources; plants producing biopesticide compounds; Ecological and economic benefits of using biopesticides; student innovative ideas in environmental management; designing innovative work of students in environmental management; student's innovative performance in environmental management.
Attribute Soft skill:	Discipline, collaboration, responsibility, and argumentation in the natural classroom setting
Study/exam achievements:	Students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade

<table>
<tr><td></td><td>(NA) is calculated based on the following weight:

<table><tr><th>Assessment Components</th><th>Percentage Contribution</th></tr><tr><td>Participation</td><td>20%</td></tr><tr><td>Assignment</td><td>30%</td></tr><tr><td>Mid-semester test</td><td>20%</td></tr><tr><td>Final semester test</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table></td></tr>
<tr><td>Learning Methods</td><td>Project-based learning, lecturing, discussion, and presentation (structured activities).</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint slides, worksheets, and e-learning Vinesa (https://vinesa.unesa.ac.id/course/view.php?id=171)</td></tr>
<tr><td>Literature (primary references):</td><td>1. Koul, O. & Dhaliwal, D. S (Ed). 2002. Microbial Biopesticides. New York: Taylor & Francis
2. Martini, dkk. 2018. Penumbuhan Budaya Akademik dalam Konteks Ecopreneurship. Surabaya: Unesa University Press.
3. Mousdale, D.M. 2008. Biofuels: Biotechnology, Chemistry, and Sustainable Development. New York: Taylor & Francis.
4. Ristek, 2012. 104 Inovasi Indonesia. Jakarta: Business Innovation Center (BIC)
5. William Linda D. 2005. Environmental Science. USA: Mc Graw Hill.
6. Winarsih, 2015. Peran Mahasiswa dalam Pembangunan Berkelanjutan. Kumpulan Handout.</td></tr>
<tr><td rowspan="2">Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</td></tr>
<tr><td>**1 sks = 1,59 ECTS</td></tr>
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