

MODULE HANDBOOK

Biology



UNDERGRADUATE PROGRAM
DEPARTMENT OF STATISTICS

FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE



MODULE HANDBOOK ENGLISH DEPARTMENT OF STATISTICS INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses <i>Process</i>	Penanggung Jawab <i>Person in Charge</i>			Tanggal <i>Date</i>
	Nama <i>Name</i>	Jabatan <i>Position</i>	Tandatangan <i>Signature</i>	
Perumus <i>Preparation</i>	Prof. Dr. Enny Zulaika, MP.	Dosen <i>Lecturer</i>		
Pemeriksa dan Pengendalian <i>Review and Control</i>	Prof. Dr. Enny Zulaika, MP.	Tim kurikulum <i>Curriculum team</i>		
Persetujuan <i>Approval</i>		Koordinator RMK <i>Course Cluster Coordinator</i>		
Penetapan <i>Determination</i>	Dr. Kartika Fithriasari, M.Si	Kepala Departemen <i>Head of Department</i>		

MODULE HANDBOOK

BIOLOGY

Module name	Biology	
Module level	Undergraduate	
Code	SB 234101	
Course (if applicable)	English	
Semester	1 st or 2 nd semester	
Person responsible for the module	Prof. Dr. Enny Zulaika, MP.	
Lecturer	Lecturer of Biology Department	
Language	Indonesia English	
Relation to curriculum	Undergraduate degree program, mandatory , 1 st or 2 nd semester.	
Type of teaching, contact hours	Case Method (12.5%) Team Based Project (25%) Other SCL Methods (62.5%)	
Workload	<ol style="list-style-type: none"> 1. Lectures[L]: 2 x 50 = 100 minutes per week. 2. Exercises and Assignments [EA]: 2 x 60 = 120 minutes (2 hours) per week. 3. Independent Learning [IL]: 2 x 60 = 120 minutes (2 hours) per week. 	
Credit points	2 credit points (sks), Equivalent 3.2 ECTS	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	<p>CLO 1. Having a good attitude, morality, honest, ethical, and appreciative to others professional scientist</p> <p>CLO 2. Able to implement science and technology with logical, critical, systematic, and innovative thinking according to their field of expertise</p> <p>CLO 3. Able to interpret life theory concepts from cells to individuals and implement them in the environment</p> <p>CLO 4. Able to apply the substance of biological sciences in social life.</p>	<p>PLO.6</p> <p>PLO.7</p>

Content	Biology studies life as a science, is the concept of life from cells to individuals; and the diversity of living things and their interactions with the environment. The learning process through teaching and learning activities in class, case studies, assignments, discussions, and evaluations
Assessment and its weight	Assignment (35%) Quiz (25%) Project (25%) Cognitive Final Exam (15%)
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading list	1. Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Lisa A. Urry, and Jane B. Reece, 2017, Campbell Biology, 11th Edition. Published by Pearson.



INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FAKULTAS SAINS DAN ANALITIKA DATA
STATISTIKA
S1 STATISTIKA

Mata Kuliah Course	Kode MK Course Code	Rumpun Mata Kuliah Course group	Kredit Credits	Semester	Tanggal Revisi Revision date
Biologi Biology	SB 234101	Biologi Biology	2	Gasal/Genap Odd/Even	Oktober 2022
Koordinator Mata Kuliah Course Coordinator			Koordinator Rumpun Mata Kuliah Course group coordinator		Kasubdit SKPB
Dosen Departemen Biologi <i>Lecturer of Biology Department</i>			Prof. Dr. Enny Zulaika, MP.		Dr. Didik Khusnul Arif, MSi

Capaian Pembelajaran Lulusan (CPL) Learning Outcomes (LO)	Program Studi Study Program
	<ul style="list-style-type: none"> CPL 02-Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang biologi, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir melalui pemikiran logis, kritis, sistematis dan inovatif LO 02-<i>Able to utilize science and technology to apply it in the field of biology, and able to make appropriate decisions based on individual or group work in the form of a final project report through logical, critical, systematic and innovative thinking</i> CPL 04-Mampu menginterpretasikan konsep teori biologi seluler dan molekuler, organisme, ekologi dan evolusi LO 04-<i>Able to interpret the theoretical concepts of cellular and molecular biology, organisms, ecology and evolution</i>
	Capaian Pembelajaran Mata Kuliah (CPMK) Course Learning Outcomes (CLO)
	<ol style="list-style-type: none"> Berperilaku baik, berakhlak mulia, jujur, beretika, dan menghargai ilmuwan/profesional lainnya <i>Having a good attitude, morality, honest, ethical, and appreciative to others professional scientist</i> Mampu mengimplementasikan ilmu pengetahuan dan teknologi dengan pemikiran logis, kritis, sistematis, dan inovatif sesuai dengan bidang keahliannya <i>Able to implement science and technology with logical, critical, systematic, and innovative thinking according to their field of expertise</i>

	<p>3. Mampu menginterpretasikan konsep teori kehidupan pada dari tingkat sel sampai individu dan mengimplementasikan ke lingkungan <i>Able to interpret life theory concepts from cells to individuals and implement them in the environment</i></p> <p>4. Mampu menerapkan substansi ilmu biologi dalam kehidupan bermasyarakat <i>Able to apply the substance of biological sciences in social life</i></p>
<p>Deskripsi Mata Kuliah</p> <p><i>Description of Material Study</i></p>	<p>Mata kuliah Biologi mempelajari kehidupan sebagai ilmu pengetahuan, dimulai konsep dasar kehidupan dari tingkat sel sampai individu; serta keanekaragaman makhluk hidup dan interaksinya dengan lingkungan. Proses pembelajaran melalui kegiatan belajar mengajar di kelas, studi kasus, tugas dan diskusi, dan evaluasi</p> <p><i>Biology studies life as a science, is the concept of life from cells to individuals; and the diversity of living things and their interactions with the environment. The learning process through teaching and learning activities in class, case studies, assignments, discussions, and evaluations</i></p>
<p>Pokok Bahasan</p> <p><i>Topic of study</i></p>	<p>Sain dan etika ilmuwan; Konsep hidup; Struktur dan dinamika sel; Sintesis dan energi; Reproduksi; Evolusi; Sistemika dan keanekaragaman; Struktur dan perkembangan tumbuhan-hewan; Pengantar Bioteknologi; Pengantar Ekologi, Studi kasus</p> <p><i>Scientist ethics; The concept of life; Cell structure and dynamics; Synthesis and energy; Reproduction; Evolution; Systematics and diversity; Structure and development of plants and animals; Introduction to Biotechnology; Introduction to Ecology, Case studies</i></p>
<p>Pustaka</p> <p><i>Reference</i></p>	<p>Utama / Main</p> <p>Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Lisa A. Urry, and Jane B. Reece, 2017, Campbell Biology, 11th Edition. Published by Pearson.</p> <p>Pendukung / Supporting</p> <p>Buku textbook yang lain / <i>Another textbook</i></p>
<p>Media Pembelajaran</p> <p><i>Learning Media</i></p>	<p>LCD, Papan tulis, Video / <i>LCD, White board, Video</i></p>
<p>Pengajar team</p> <p><i>Team Teaching</i></p>	<p>Dosen Departemen Biologi FSAD ITS / <i>Lecturer of Department Biology</i></p>
<p>Assesmen</p> <p><i>Assessment</i></p>	<p>Tes tulis (ETS dan EAS), Studi kasus dengan presentasi dan diskusi, serta Tugas mandiri <i>Quiz, Evaluation (writing test), Presentation and Discussion, Homework</i></p>

Minggu <i>Week</i>	Kemampuan akhir pada tahap pembelajaran (Sub CP-MK) <i>End of learning ability (Lesson Learning Outcome /LLO)</i>	Penilaian <i>Assessment</i>		Bentuk Pembelajaran, Metode Pembelajaran dan Penugasan Mahasiswa (Estimasi waktu) <i>Learning Forms, Learning Methods and Student Assignments (Estimated time)</i>		Materi Pembelajaran (Pustaka) <i>Topic (Reference)</i>	Bobot Penilaian (%) <i>Weight Assesment (%)</i>
		Indikator <i>Indicator</i>	Kriteria <i>Criteria</i>	Luring <i>offline</i>	Daring <i>online</i>		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Mahasiswa mampu meniru sikap ilmuwan, termasuk attitude santun, jujur, dan tidak melakukan plagiarism (C2)	Dapat bersikap sebagai ilmuwan yang santun, jujur, dan tidak melakukan plagiarism	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> Dosen interaktif Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	<ul style="list-style-type: none"> Kontrak perkuliahan Etika Ilmuwan 	5
	<i>Students able to imitate the attitudes of scientists, including polite, honest, and not plagiarism (C2)</i>	<i>Can to demonstrate an attitude as a scientist who is polite, honest, and does not commit plagiarism</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> <i>Interactive lecturer</i> <i>Practice/quiz</i> [IL: 1 x (2x50 ")] [CRA+SS: (1+1) x (2x60')]	-	<ul style="list-style-type: none"> <i>Lecture contract</i> <i>Ethics of Scientist</i> 	
2	Mahasiswa mampu memahami konsep dan asal usul kehidupan (C2)	Dapat menjelaskan dengan benar tentang konsep kehidupan ditinjau dari keilmuan biologi	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> Dosen interaktif Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Sain dan Konsep kehidupan	5
	<i>Students able to understand the concept of life (C2)</i>	<i>Explain correctly about the concept of life</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> <i>Interactive lecturer</i> <i>Practice/quiz</i> [IL: 1 x (2x50 ")] [CRA+SS: (1+1) x (2x60')]	-	<i>Science and Concepts of life</i>	
3	Mahasiswa memahami struktur sel dan dinamikanya (C2)	Dapat membedakan struktur sel dan dinamika sel prokariotik dan eukariotik	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> Dosen interaktif Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Struktur dan dinamika sel	5

	<i>Students understand the structure of cells and their dynamics (C2)</i>	<i>Can distinguish cell structure and dynamics of prokaryotic and eukaryotic</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Cell structure and dynamics</i>	
4	Mahasiswa memahami metabolisme yang terjadi di dalam sel (C2)	Dapat menjelaskan kembali metabolisme yang terjadi di dalam sel	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Sintesis dan energi (autotrof dan heterotrof)	5
	<i>Students understand the metabolism that occurs in cells (C2)</i>	<i>Can explain again the metabolism that occurs in the cell</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Synthesis and energy (autotrophs and heterotrophs)</i>	
5	Mahasiswa memahami siklus sel untuk reproduksi dan sifat-sifat genetik yang diwariskan (C2)	Dapat menjelaskan dengan benar siklus sel, fungsi reproduksi dan dapat menghitung kemungkinan sifat genetik yang diturunkan dari induk ke anak	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Siklus sel dan genetika	5
	<i>Students understand the cell cycle for reproduction and inherited genetic traits (C2)</i>	<i>can correctly explain the cell cycle, reproductive function and can calculate the possibility of genetic traits being passed from parent to offspring</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Cell cycle and genetics</i>	
6	Mahasiswa memahami proses terjadinya evolusi (C2)	Dapat menjelaskan dan menelusuri proses evolusi yang terjadi pada makhluk hidup	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Evolusi	5
	<i>Students understand the process of evolution (C2)</i>	<i>Can explain and trace the evolutionary processes that occur in living things</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz 	-	<i>Evolution</i>	

				<i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>			
7	Mahasiswa memahami keanekaragaman makhluk hidup (C2)	Dapat membedakan dan menggolongkan makhluk hidup berdasarkan morfologi, strata evolusi dan keanekaragaman yang ada di bumi	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Sistematika dan keanekaragaman	5
	<i>Students understand the diversity of living things (C2)</i>	<i>can distinguish and classify living things based on morphology, evolutionary strata and diversity on earth</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • <i>Interactive lecturer</i> • <i>Practice/quiz</i> <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>		<i>Systematics and diversity</i>	
8	Mahasiswa dapat melewati separoh CP MK yang telah didapatkan selama 6 minggu pembelajaran Biologi	-	Tes tulis	[TM: 1 x (2x50 ")		Evaluasi Tengah Semester (ETS)	(Total 1-6 → bobot penilaian 30%)
	<i>Students can pass half the LLO that has been obtained during 6 weeks of Biology learning</i>		<i>Written test</i>	<i>[IL: 1 x (2x50 ")</i>		<i>Mid Test</i>	<i>(Total 1-6 → Weight Assesment 30%)</i>
9	Mahasiswa memahami struktur dan fungsi organ pada tumbuhan (C2)	Dapat membedakan struktur dan fungsi organ pada tumbuhan	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Struktur dan perkembangan tumbuhan	5
	<i>Students understand the structure and function of organs in plants (C2)</i>	<i>able to distinguish the structure and function of organs in plants</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • <i>Interactive lecturer</i> • <i>Practice/quiz</i> <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Plant structure and development</i>	
10	Mahasiswa memahami struktur dan fungsi organ pada hewan (C2)	Dapat membedakan struktur dan fungsi organ pada hewan	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Struktur dan perkembangan hewan	5

	<i>Students understand the structure and function of organs in animals. (C2)</i>	<i>able to distinguish the structure and function of organs in animals</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Animal structure and development</i>	
11	Mahasiswa memahami konsep bioteknologi (C2)	Dapat memahami dan menjelaskan kembali konsep bioteknologi dalam kehidupan sehari-hari	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Pengantar Bioteknologi	5
	<i>Students understand the concept of biotechnology (C2)</i>	<i>able to understand and re-explain the concept of biotechnology</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Introduction to Biotechnology</i>	
12	Mahasiswa memahami konsep ekologi dan pengelolaannya untuk konservasi lingkungan. (C2)	Dapat menjelaskan kembali konsep ekologi dan pengelolaannya untuk konservasi lingkungan dan keberlanjutannya	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Pengantar Ekologi	5
	<i>Students understand the concept of ecology and its management for environmental conservation. (C2)</i>	<i>can re-explain the concept of ecology and its management for environmental conservation and sustainability</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Introduction to Ecology</i>	
13	Mahasiswa mampu bekerja kelompok untuk mendapatkan solusi permasalahan (bidang lingkungan)	Dapat bekerja kelompok untuk menyelesaikan suatu kasus di bidang lingkungan	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> • Dosen interaktif • Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Studi kasus bidang lingkungan	10
	<i>Students able to work in groups to find solutions to problems (environmental case) (C3)</i>	<i>Can work in groups to solve a polluted environment case</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> • Interactive lecturer • Practice/quiz <i>[IL: 1 x (2x50 ")</i> <i>[CRA+SS: (1+1) x (2x60')</i>	-	<i>Environmental case studies</i>	

14	Mahasiswa mampu bekerja kelompok untuk mendapatkan solusi permasalahan (bidang medis dan farmasi)	Dapat bekerja kelompok untuk menyelesaikan suatu kasus di bidang medis dan farmasi	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> Dosen interaktif Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Studi kasus bidang medis dan farmasi	10
	<i>Students able to work in groups to find solutions to problems (medical and pharmaceutical case) (C3)</i>	<i>Can work in groups to solve medical and pharmaceutical cases</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> <i>Interactive lecturer</i> <i>Practice/quiz</i> [IL: 1 x (2x50 ")] [CRA+SS: (1+1) x (2x60')]	-	<i>Medical and pharmaceutical case studies</i>	
15	Mahasiswa mampu bekerja kelompok untuk mendapatkan solusi permasalahan (bidang teknik)	Dapat bekerja kelompok untuk menyelesaikan suatu kasus di bidang keteknikan	Aktivitas kelas atau Tugas mandiri	<ul style="list-style-type: none"> Dosen interaktif Latihan/kuis [TM: 1 x (2x50 ")] [PT+BM: (1+1) x (2x60')]	-	Studi kasus bidang keteknikan	10
	<i>Students able to work in groups to find solutions to problems (engineering case) (C3)</i>	<i>Can work in groups to solve engineering cases</i>	<i>Class activities or Individual assignments</i>	<ul style="list-style-type: none"> <i>Interactive lecturer</i> <i>Practice/quiz</i> [IL: 1 x (2x50 ")] [CRA+SS: (1+1) x (2x60')]	-	<i>Engineering case studies</i>	
Total bobot asesmen aktivitas kelas							15
The total weight of the assessment of class activities							15
16	Mahasiswa dapat melewati seluruh CPMK yang telah didapatkan dari mata kuliah Biologi		Tes tulis	[TM: 1 x (2x50 ")]	-	Evaluasi Akhir Semester	(Total 8-12 → bobot penilaian 25%)
	<i>Students have passed all the CLOs that have been obtained from the Biology course</i>		<i>Written test</i>	<i>[IL: 1 x (2x50 ")]</i>	-	<i>Final test</i>	<i>(Total 8-12 → Weight Assesment 25%)</i>
Total Bobot Penilaian (%)							100%
Total of Weight Assesment							100%

Catatan/Note

TM=Tatap Muka, PT=Penugasan Terstruktur, BM=Belajar Mandiri

IL=Interactive Lecture, CRA=Constructed-Response Assignment, SS=self-study