module
handbook
curriculum 2020-2025

BIO.LOGY

Study Program of Biology
Faculty of Sains and Technology
UIN Syarif Hidayatullah Jakarta

CONTENTS

I. CURRICULUM STRUCTURE

SEMESTER I

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	NAS6013203	Indonesian	3	4,13
2	UIN6021204	Arabic	3	4,13
3	UIN6032201	Islamic Studies	4	5,51
4	FST6095101	Basic Biology	2	2,76
5	FST6095102	Practicum Basic Biology	1	2,47
6	FST6094101	Calculus	2	2,76
7	FST6096201	Basic Chemistry	2	2,76
8	FST6096202	Practicum Basic Chemistry	1	2,47
9	FST6097114	Basic Physics	2	2,76
		Total Credit Points	**20**	**29,73**

SEMESTER II

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	UIN6014203	English	3	4,13
2	FST6095105	Laboratory Technique	2	2,76
3	FST6095107	Plant Structure and Development	3	4,13
4	FST6095108	Practicum Plant Structure and Development	1	2,47
5	FST6095111	Animal Systematics	2	2,76
6	FST6095112	Practicum Animal Systematics	1	2,47
7	NAS6112201	Pancasila and Civic Education	3	4,13
8	FST6095124	Cell Biology	2	2,76
9	FST6091101	Introduction to Information and Communications Technology	2	2,76
10	UIN6033205	Practicum Qira'ah and Worship	2	2,76
		Total Credit Points	**21**	**31,11**

SEMESTER III

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	FST6095103	Basic Ecology	3	4,13
2	FST6095104	Practicum Basic Ecology	1	2,47
3	FST6095144	Genetics	3	4,13
4	FST6095115	Practicum Genetics	1	2,47
5	FST6095106	Basic Microbiology	2	2,76
6	FST6095117	Practicum Basic Microbiology	1	2,47

7	FST6095128	Plant Systematics	2	2,76
8	FST6095109	Practicum Plant Systematics	1	2,47
9	FST6095110	Animal Structure and Development	3	4,13
10	FST6095129	Practicum Animal Structure and Development	1	2,47
11	FST6096225	Biochemistry	2	2,76
12	FST6096226	Practicum Biochemistry	1	2,47
		Total Credit Points	**21**	**36,84**

SEMESTER IV

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	FST6094106	Elementary Statistics	3	4,13
2	FST6095132	Conservation Biology	2	2,76
3	FST6095113	Microbial Physiology	2	2,76
4	FST6095114	Animal Physiology	3	4,13
5	FST6095135	Practicum Animal Physiology	1	2,47
6	FST6095116	Plant Physiology	3	4,13
7	FST6095127	Practicum Plant Physiology	1	2,47
8	UIN6032202	Islam and Science	3	4,13
		Mandatory	**18**	
		Electives	**4**	
		Total Credit Points	**22**	
		Electives		
1	FST6095202	Ornithology	2	2,76
2	FST6095204	Bacteriology	2	2,76
3	FST6095205	Phycology	2	2,76
4	FST6095207	Terrestrial Ecology	2	2,76
5	FST6095208	Urban Entomology	2	2,76
				32,49

SEMESTER V

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	FST6095118	Molecular Biology	2	2,76
2	FST6095119	Practicum Molecular Biology	1	2,47
3	FST6095120	Natural Resource and Management	2	2,76
4	FST6095121	Principles of Biotechnology	2	2,76
5	FST6096150	Chemical Environment	2	2,76
6	FST6096151	Practicum Chemical Environment	1	2,47
7	UIN6000208	Research Methodology	3	4,13

		Mandatory	**13**	**15,96**
		Electives	**8**	**11,02**
		Total Credit Points	**21**	
		Electives		
1	FST6095209	Plant Tissue Culture	2	2,76
2	FST6095210	Aquatic Ecology	2	2,76
3	FST6095211	Mycology	2	2,76
4	FST6095212	Ethology	2	2,76
5	FST6095213	Secondary Metabolism	2	2,76
6	FST6095214	Mammalogy	2	2,76
7	FST6095215	Palynology	2	2,76
8	FST6095216	Population Genetics	2	2,76
9	FST6095217	Herpetology	2	2,76
10	FST6095218	Ecotourism	2	2,76
		Total Credit Points	**21**	**26,98**

SEMESTER VI

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	FST6095122	Evolution	2	2,76
2	FST6095123	Introduction to Bioinformatics	2	2,76
3	FST6095134	Scientific Communication Techniques	2	2,76
4	UIN6000207	Internship	4	9,07
		Mandatory	**10**	**17,33**
		Electives	**10**	**13,78**
		Electives	**36**	
1	FST6095219	Food Microbiology	2	2,76
2	FST6095220	Parasitology	2	2,76
3	FST6095221	Plant Ecophysiology	2	2,76
4	FST6095222	Landscape Ecology	2	2,76
5	FST6095223	Ethnobotany	2	2,76
6	FST6095224	Embryology	2	2,76
7	FST6095225	Waste Management	2	2,76
8	FST6095226	Environmental Biotechnology	2	2,76
9	FST6095227	Plant Biotechnology	2	2,76
10	FST6095228	Introduction to Environmental Impact Analysis	2	2,76
11	FST6095229	Immunology	2	2,76
12	FST6092030	Halal Food	2	2,76
13	FST6095231	Malacology	2	2,76

14	FST6095232	Primatology	2	2,76
15	FTK6017150	Strategies and Learning Biology	2	2,76
16	FTK6017153	Media and Technology Learning Biology	2	2,76
17	FTK6017155	Evaluation of Biology Learning	2	2,76
18	FTK6017158	Planning Learning Biology	2	2,76
		Total Credit Points	**20**	**31,11**

SEMESTER VII

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	FST6095125	Bioethics	2	2,76
2	FST6092035	Technopreneurship	2	2,76
3	UIN6000206	Community Service Program	4	9,07
4	FST6095126	Proposal Seminar	1	1,20
		Mandatory	**9**	**15,78**
		Electives	**6**	**8,27**
		Electives	**18**	
1	FST6095233	Industrial Microbiology	2	2,76
2	FST6095235	Phytopathology	2	2,76
3	FST6095236	Plant Breeding	2	2,76
4	FST6095237	Environmental Toxicology	2	2,76
5	FST6095238	Biomaterials and Nanotechnology	2	2,76
6	FST6095239	Genetics Engineering	2	2,76
7	FST6095242	Ichthyology	2	2,76
8	FST6095244	Marine Biology	2	2,76
9	FST6095240	Virology	2	2,76
		Total Credit Points	**15**	**24,04**

SEMESTER VIII

No	Code of Course	Mandatory Course	Credit Points	ECTS
1	UIN 6000312	Final Project (Thesis)	6	7,20
2	UIN 6000313	Seminar	1	1,20
		Total Credit Points	**7**	**8,40**
		Total Credits (SKS or SCU) for Completion of Bachelor Program		**148**
		Total Credits (ECTS) for Completion of Bachelor Program		**220,71**

II. MAIN COMPETENCY COURSES (MAC)

NAS6013203 Indonesian

Module Name	Indonesian
Module level, if applicable	Undergraduate
Module Identification Code	NAS6013203
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Neneng Nurjanah, M.Hum.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Lecture, class discussion, structured activities (homework, quizzes).
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h Structured activities: 3 x 60 min x 14 wks = 42 h Independent study: 3 x 60 min x 14 wks = 42 h Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours ≈ 4.133 ECTS
Admission and examination requirements	• Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	-
Media employed	Board, LCD Projector, Laptop/Computer
Forms of assessment	● Assignments (including quizzes and assignment): 40% ● Midterm exam: 30% ● Final exam: 30%
Intended Learning Outcome	

1. Speaking Skills in Academic Presentation: Students are able to speak in scientific presentations.
2. Understanding the Development of the Indonesian Language: Students can understand the development of the Indonesian language.
3. Understanding the Use of Letters and Words: Students can understand the use of letters and words.
4. Understanding Borrowed Words and Punctuation: Students can understand borrowed words and punctuation.
5. Proper Diction Usage: Students are able to use appropriate diction.
6. Crafting Effective Sentences: Students are able to create effective sentences.
7. Constructing Proper Paragraphs: Students are able to create proper paragraphs.
8. Understanding Plagiarism: Students understand plagiarism.
9. Essay Planning Abilities: Students are able to plan an essay.
10. Effective Reasoning Skills: Students are able to reason accurately.
11. Utilizing Scientific Notation Efficiently: Students are able to use scientific notation efficiently.
12. Producing Short Writings Correctly: Students are able to produce short writings correctly.
13. Reproduction of Writing Accurately: Students are able to reproduce writings accurately.

Module content

1. Speaking in Scientific Presentations;
2. Development of the Indonesian Language;
3. Usage of Letters and Words;
4. Borrowed Elements, Punctuation, and Transliteration;
5. Diction/Word Choice;
6. Effective Sentences;
7. Paragraphs;
8. Scientific Ethics/Plagiarism;
9. Essay Planning;
10. Reasoning;
11. Scientific Notation;
12. Short Writing Production;
13. Writing Reproduction.

Recommended Literatures

1. Arifin, E. Zainal dan S. Amran Tasai. Cermat Berbahasa Indonesia. Jakarta : Akademika Pressido, 2006
2. Akhadiah, Sabarti dan Sakura Ridwan. Pembinaan Kemampuan Menulis bahasa Indonesia. Jakarta : Airlangga, 1993
3. Finoza, Lamuddin. Komposisi Bahasa Indonesia. Jakarta : Diksi Insan Mulia, 2001.
4. Gani, Ramlan A dan Mahmudah Fitriyah Z.A. Disiplin Berbahasa Indonesia. Jakarta : PTIK Press, 2010.
5. Hs., Widjono. Bahasa Indonesia. Jakarta : Grasindo, 2007.
6. Keraf, Gorys. Komposisi. Ende : Nusa Indah, 1993.
7. Putra, R. Masri Sareb Putra. Kiat Menghindari Plagiat. How to Avoid Plagiarisme. Jakarta : Indeks, 2011.

UIN6021204 Arabic

Module Name	Arabic
Module level, if applicable	Basic
Module Identification Code	UIN6021204
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Saifudin, M.Pd.I
Language	Arabic, Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): 3 x 50 min x 14 wks = 35 h Structured activities: 3 x 60 min x 14 wks = 42 h Independent study: 3 x 60 min x 14 wks = 42 h Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None

Media employed	Classical teaching tools with white board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to understand the basic knowledge of Arabic and its methods orally and in writing using good and correct Arabic and Indonesian in the development of the academic world and the non-academic world. Able to communicate both orally and in writing using Arabic and Indonesian in the development of the academic and non-academic world. Mastering four Arabic language skills, istima', kalam, qira'ah and kitabah and implementing them in social life.

Module content

1. Terminology: ta'rîf, aqsâm, syakl, 'alâmât, wa misâl (Words: definition, division, characteristics/form, characteristics/signs and examples)
2. Isim Nakirah-Ma'rifah wa mudzakar-Muannats: ta'rîf, aqsâm, 'alâmât, wa misâl
3. Isim Mufrad, Mutsanna, wa Jama': ta'rîf, aqsâm, 'alâmât, wa misâl
4. Isim Jama': ta'rîf, aqsâm, 'alâmât, wa misâl
5. 'Adad dan Ma'dud: ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
6. Isim Isyarah: ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
7. Isim Istifham : ta'rîf, aqsâm, 'alâmât,syakl, wa misâl
8. Isim Dlamir : ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
9. Fi'il Madli : ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
10. Fi'il Mudlari : ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
11. Fi'il Amr : ta'rîf, aqsâm, 'alâmât,tashrîf, wa misâl
12. Maf'ul: ta'rîf, aqsâm, 'alâmât, syakl, wa misâl
13. Ismiyah number : ta'rîf, aqsâm, 'alâmât,tarkîb, wa misâl
14. Fi'liyah number: ta'rîf, aqsâm, 'alâmât,tarkîb, wa misâl

Recommended Literatures

1. Abd al-Fattâh Shabrî dan 'Ali 'Umar, *al-Qirâ-ah al-Râsyidah*, (Mesir: Dar al-Ma'arif, 1945).
2. Fu'ad Ni'mah, *Mulakhash Qawâ'id al-Lughah al-'Arabiyah*, (Surabaya: al-Hidayah, tth).
3. Mahmud Yunus, *al-Muthâla'ah al-Haditsah*, (Jakarta: Maktabah al-Sa'diyah Putra, 1937).
4. Majmu'ah, *Al-'Arabiyah baina Yadaik,* 2008.
5. Sayyid Ahmad al-Hâsyimî, *al- Qawâ'id al-Asâsiyah li al-Lughah al-'Arabiyah*, (Kairo: Muassasah al-Mukhtar, 2006).

UIN6032201 Islamic Studies

Module Name	Islamic Studies
Module level, if applicable	Basic

Module Identification Code	UIN6032201
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Saifudin, M.Pd.I
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (4 x 50 min) x 14 wks = 46.67 h Structured activities: 4 h x 14 wks = 56 h Independent study: 4 h x 14 wks = 56 h Exam: 200m x 2 (mid test and final test) = 6.66 h Total = 165.33 h
Credit points	4 Credit Hours ≈ 5.51 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain the basic concepts of Islam properly and correctly. Students are able to describe the source, history, position, and values as well as the methodology of Islamic teachings. Students are able to apply the values of Islamic teachings in academic social life.	
Module content	
1. Introduction, Object/Scope, Objectives, History and Methodology of Islamic Studies 2. Humans concepts, the Universe, and Religion in Islam 3. Islam: Definition, Sources, Position, Function and History 4. Al-Quran (Meaning, Position and Function, and History in Islam) 5. Hadith (Meaning, Object of Study, Position and Historical Function in Islam) 6. Islamic Doctrines and Teachings (Aqidah, Sharia and Akhlak), their Branches as well as Hierarchy and Relationships. 7. Tawhid and the Prophethood Concept: Meaning, Scope, Position and Function in Islam	

8. Qadla, Qadar and the Actions of creatures in Islam: Definition, Object of Study, Position, Function and Lessons
9. Eschatology/Last Days in Islam: Understanding, Object of Study and Position, and Events
10. Shirk, Kufr, Nifaq, Fisq and al-Kabair According to Islam
11. Islam and its Shari'ah: Definition, Types, Functions, Objects of Study, Sources and History, and the Tasyri' Process
12. Morals and Ethics concepts in Islam
13. Islam and Civilization: History and Development of Islam from the Prophet SAW time to Islam at Indonesia
14. Islam in Indonesia: Concept, Implementation and Social History

Recommended Literatures

Primary:

1. Al-Quran al-Karim
2. Al-Kutub al-Sittah (Shahih al-Bukhari, Shahih Muslim, Sunan al-Tirmidzi, Sunan al-Nasai, dan Sunan Ibn Majah)
3. Ibn Hisyam, Abu Muhammad Abd al-Malik, Al-Sirah al-Nabawiyah, 2002. Kairo: Dar al-Ghad al-Jadid.
4. Ibn Rusyd, 2004. Bidayah al-Mujtahid wa Nihayah al-Muqtashid, Kairo: Dar al-Hadis.
5. al-Jaziri, Abu Bakar Jabir. 2004. Aqidah al-Mu'min, Madinah: Maktabah al-'Ulûm wa al-Hikam.
6. Khalil, Moenawar. 1993. Kelengkapan Tarikh Nabi Muhammad SAW, Jakarta: Bulan Bintang.
7. al-Razi, Fakhruddin, Mafâtih al-Ghaib, Beirût: Dâr Ihyâal-Turâts al-'Arabî, 1429 H.
8. Al-Yubi, Muhammad Sa'ad ibn Ahmad, 1998. Maqâshid al-Syarîah al-Islâmiyah, Riyadl: Dar al-Hijrah li al-Nasyr wa al-Tawzi'.

Supplementary

1. Abd. Hakim, Atang dan Jaih Mubarok, 2000. Metodologi Studi Islam, Bandung: Remaja Rosdakarya.
2. 'Abdul Hamîd, 'Irfan , tth. Dirasât fi al-Firaq wa al-'Aqâid al-Islamiyah, Baghdâd: Mathba'ah As'ad.
3. Abdul Baqi, Muhammad Fuad, tth. Al-Mu'jam al-Mufahras li al-Fâzh al-Qur'ân al-al-Karîm, Bandung: CV Diponegoro, tth.
4. Abdurrahman, Dudung, dkk. 2009. Sejarah Peradaban Islam: dari Masa Klasik hingga Modern, Yogyakarta: LESFI.

FST6095101 Basic Biology

Module Name	Basic Biology
Module level, if applicable	Basic
Module Identification Code	FST6095101
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si.,
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.756 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,756 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Generalize basic knowledge of biology which can lead to detailed knowledge at an advanced stage	
Module content	
1. Basic concepts of biology 2. Chemistry of life 3. Cell structure and function 4. Life energy 5. Energy release: cellular respiration 6. Energy capture: photosynthesis 7. Cell division 8. Basics of genetics 9. Evolution and biodiversity 10. Plant structure and physiology 11. Animal structure and physiology 12. Ecology 13. Nature conservation 14. Biotechnology	
Recommend Literatures 1. Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., Orr, R. B., Campbell, N. A. (2021). *Campbell biology*. Pearson Education, Inc., NJ.	

2. Pendukung
3. Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., & Reece, J. B. (2014). *Campbell biology in focus* (Vol. 10). Boston, MA: Pearson.

FST6095102 Practicum Basic Biology

Module Name	Practicum Basic Biology
Module level, if applicable	Basic
Module Identification Code	FST6095102
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course,
- Students are able to work neatly and carefully
- Students are able to understand the methods applied in biological experiments
- Students are able to take the essence of each experiment conducted
- Students are able to understand the results of observations in accordance with the objectives of the experiment
- Students are able to understand and analyse a problem with scientific principles

Module content

1. Work techniques in a biological laboratory
2. Microscope and cell observation
3. Animal tissue
4. Plant tissue
5. Animal observation: the fish organs and organ systems
6. Plant observation: the Monocots and Dicots organs and organ systems

7. Photosynthesis 8. Respiration 9. Plant DNA extraction 10. Living things and the environment: air pollution 11. Fermentation 12. Basic principles of classification of living things
Recommended Literatures : 1. BSCS. (2006). Biology, a Molecular Approach. New York: McGrawHill Glencoe. 2. Campbell, N. A, J. B. Reece, L. A. Urry, M. L. Cain, S. A. Wasserman, P. V. Minorsky, R. B. Jackson. (2008). Biologi, Jilid 1, 2, 3, Edisi Bahasa Indonesia. Jakarta: Erlangga. 3. Rezba, R. J., Sparague, C. S., Fiel, R. L., Funk, H. J., Okey, J. R., & Haus, H. H. (1995). Learning and Assessing Science Process Skills. (3rd ed.). Iowa: Kendall/ Hunt Publishing Company. 4. Solomon, E. F., Berg, L. R., dan Martin, S. W. (2008).Biology, Eight Edition. Thomson Brooks/ Cole. 5. Starr, C., C. A. Evers, L. Starr. (2008). Biology, Concepts and Applications, Seven Edition. Thompson Brooks/ Cole. 6. Wijayanti, F., Pikoli, M.R., & Astuti, P. Panduan Praktikum Biologi Dasar. Jakarta: Fakultas Sains dan Teknologi, Universitas Islam Negeri Syarif Hidayatullah

FST6094101 Calculus

Module Name	Calculus
Module level, if applicable	Undergraduate
Module Identification Code	FST 6094101
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Agus Salim
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Lecture, class discussion, structured activities (homework, quizzes).
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours ≈ 2.755 ECTS
Admission and examination requirements	• Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	Student should be proficient in elementary algebra
Media employed	Board, LCD Projector, Laptop/Computer
Forms of assessment	● Assignments (including quizzes and group project): 40% ● Midterm exam: 30%

	• Final exam: 30%
Intended Learning Outcome	
After completing this course, students are able to determine the solution of problems related to calculus of real functions systematically	
Module content	
1. Real numbers, inequalities, absolute values, Cartesian coordinate system, functions and their graphs, operations on functions, trigonometric functions. 2. Limit intuition, definition of limit, limit theorems, limit of trigonometric functions, limit at infinity, infinite limit, function continuity 3. Definition of derivative, derivative rules, derivatives of trigonometric functions, chain rules, higher order derivatives, implicit derivatives, related rates, basic concepts of differentials 4. Maximum and minimum, monotonicity and steepness, local extremes and extreme values on open intervals, drawing curves of real functions of 1 variable, anti-derivatives 5. Intuition integral, definite integral, Fundamental Theorem I of Calculus, Fundamental Theorem II of Calculus, substitution method. 6. Area, volume of a rotating body. 7. Natural logarithm function, inverse function and its derivative, natural exponential function, generalised exponential function and generalised logarithm function, hyperbolic function and its inverse	
Recommend Literatures 1. Dale Varberg, Edwin Purcell, Steve Rigdon, Calculus, 9th edition, Pearson, 2016. 2. George B. Thomas, Jr.; Maurice D. Weir, Joel R.Hass, Kalkulus Thomas Jilid 1, edisi 13, Erlangga, 2017. ed Literatures	

FST6096201 Basic Chemistry

Module Name	Basic Chemistry
Module level, if applicable	Basic
Module Identification Code	FST 6096101
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Dr. Sri Yadial. M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into discussion groups of 3 to 4 members. Each group becomes a discussion center for its members in solving a given problem before being presented in class forum.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2.755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 30%, Final exam 30%, Quiz 20%, Structured assignment 20%

Intended Learning Outcome

Students are able to use the basic principles of chemistry in studying sciences related to chemical calculations, explaining the nature of matter, changes in matter, compounds and mixtures, basic laws of chemistry, balancing chemical reaction equations, development of the periodic system of elements, formation of chemical bonds. , Solutions, Colligative Properties Chemical Equilibrium, Acids, Bases and Buffers, Introduction to Organic Chemistry

Module content

1. Contract of practicum
2. Basic concepts of chemistry
3. Basic laws of chemistry
4. Chemical reaction equations
5. Periodic system of elements
6. Atomic structure and electron configuration
7. Chemical bonds and naming of covalent and ionic compounds
8. Solution

9. Colligative Properties 10. Chemical equilibrium 11. Acids, Bases and buffers 12. Introduction to Organic Chemistry
Recommended Literatures 1. Chang, Raymond. 2005. Kimia Dasar: Konsep-konsep Inti. Edisi 3. Erlangga. Jakarta. 2. Oxtoby, D.W., H.P. Gillis, dan Norman H.N. 2003. Prinsip-prinsip Kimia Modern. Edisi Erlangga, Jakarta.

FST6096202 Practicum Basic Chemistry

Module Name	Practicum Basic Chemistry
Module level, if applicable	Basic
Module Identification Code	FST 6096102
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Ahmad Fathoni, M.Si ; Agus Rimus Liandi, M.Si ; Nurul Amilia, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum (Laboratory), 3 h x 12 weeks
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Laboratory tools and equipments; Classical teaching tools with whiteboard and PowerPoint presentation

Forms of assessment	Midterm exam 20%, Final exam 20%, Quiz 10%, Structured assignment 50%
Intended Learning Outcome	
Students are able to conduct experiments and do data analysis in basic chemistry experiments which can support understanding in a more specific field of chemistry.	
Module content	
Experiment 1: Introduction to Chemical Laboratory Equipment as well Experiment 2: Solution Making Experiment 3: Changes in the Physical and Chemical Properties of Elements and Compounds Experiment 4: Chemical reaction Experiment 5: Limiting Reaction Experiment 6: Unsaturated, saturated and supersaturated solutions Experiment 7: Titration and Acid Base Equilibrium: pH Indicators and Measurements Experiment 8: Buffer Solution Experiment 9: Chemical equilibrium	
Recommended Literatures 1. Module of Basic Chemistry Laboratory Work I	

FST6097114 Basic Physics

Module Name	Basic Physics
Module level, if applicable	Basic
Module Identification Code	FST 6097114
Semester(s) in which the module is taught	1
Person(s) responsible for the module	Muhammad Nafian, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.

Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to understand and apply how a physical system is seen from the perspective of mechanics and thermodynamics.

Module content

1. Measurement of physical quantities and vector properties
2. Motion in one, two and three dimensions
3. Newton's laws and their applications
4. Work and kinetic energy
5. Law of conservation of energy
6. Law of conservation of linear momentum
7. Rotational dynamics
8. Angular momentum
9. Gravity
10. Fluid mechanics
11. Temperature and kinetic theory of gasses
12. Heat and the first law of thermodynamics
13. Second law of thermodynamics
14. Thermal processes and properties

References :

1. Paul Tipler, Physics for Scientists and Engineers, 5th Edition, W.H. Freeman Publisher
2. Halliday, R., Walker., Fundamental of Physics, 7th Edition. USA: John Wiley & Sons, Inc, 2006
3. D.C.Giancoli, General Physics, Prentice Hall Inc, 1984

UIN6014203 English

Module Name	English
Module level, if applicable	Basic
Module Identification Code	UIN6014203
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Inni Ayati, M.Si.
Language	Indonesian and English
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h Structured activities: 3 x 60 min x 14 wks = 42 h Independent study: 3 x 60 min x 14 wks = 42 h Exam: 3 x 50 min x 2 times = 5 h; ·Total = 124 hours
Credit points	3 Credit Hours ≈ 4,133 ECTS
Admission and examination requirements	● Enrolled in this course ● Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	. Assignments (including quizzes and assignment): 40% · Midterm exam: 30% . Final exam: 30%

Intended Learning Outcome

1. Able to implement reading strategies such as "skimming" and "scanning", identifying pronoun references, using punctuation correctly, recalling oral information, and introducing oneself.
2. Understanding the main ideas and supporting ideas in a reading, using "verbs" and "adverbs" using "mind mapping", and discussing daily activities.
3. Knowing the difference between facts and opinions in a reading, using adjectives appropriately, understanding simple opinions, and being able to describe someone.
4. Identifying important information from the reading text, writing simple

sentences, being able to ask and answer about directions. 5. Able to draw conclusions from the reading text, understanding the use of pronouns and articles, writing a memo, making/receiving/declining meeting appointments. 6. Paraphrasing sentences from the reading text, using the "simple present tense", writing a postcard, expressing likes or dislikes. 7. Identifying the meanings of words or phrases in the reading text, making conclusions, using the "simple future tense" appropriately, writing simple advertisements, and being verbally inviting. 8. Identifying the purpose of writing in a reading text, using the "simple past tense" correctly, writing personal information.
Module content 1. Mastering Effective Reading Strategies 2. Comprehension and Language Proficiency 3. Information Extraction and Language Expression Skills 4. Language Transformation and Expressing Preferences 5. Enhancing Vocabulary and Future Expressions 6. Understanding Writing Purpose and Past Expression
Recommended Literatures 1. Azkiyah, Siti Nurul et al.(2020). General English 1 (A course for University Students). Malaysia: Oxford University Press. 2. Azar, B.S. (1999). Understanding and using English Grammar (3rded). New York: Pearson Education. 3. Cusack, B., & McCarter, S. (2007). Listening and Speaking skills. Oxford: MacMillan Publisher Limited 4. Hewings, M. (2002). Advanced Grammar in use: A self Study. Cambridge: Cambridge University Press.

FST6095105 Laboratory Technique

Module Name	Laboratory Technique
Module level, if applicable	Basic
Module Identification Code	FST6095105
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to

	work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (1-3) ≈ 2.755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are: 1. Able to explain the basic concepts, functions, and mechanisms of work safety in the laboratory 2. Able to use basic laboratory tools to make specimens and simple research designs 3. Able to identify and explain materials in the laboratory, both biological and chemical materials	
Module content	
1. Introduction: Laboratory scope (K3 lab, MSDS, and BSL) 2. Introduction to basic laboratory equipment 3. Introduction to chemical and biological materials. 4. Laboratory management 5. Work safety in the laboratory 6. Basic skills in the laboratory 7. Advanced skills in using advanced equipment in the laboratory. 8. Types of microscopes and their uses. 9. Paraffin method histology. 10. Techniques for making wet and dry preserves 11. Techniques for making plant specimens 12. Techniques for making animal specimens 13. Techniques for making microorganism specimens 14. Design research experiments in the laboratory	

Recommended Literatures

1. Barger, A.M & Macnel, A.L. 2015. *Clinical Pathology and LaboratoryTechniques for Veterinary Technicians*. Oxford: Wiley-Blackwell.
2. Campbell, N.A., Reece, J.B., Urry, L.A. Cain, M.L., Wasserman, S.A., Minorsky, P.V., & Jackson, R.B. 2011. *Biologi, Edisi Kedelapan.* Jakarta: Penerbit Erlangga.
3. Hau, J. & Schapiro S.J. 2014. *Handbook of Laboratory Animal Science* 3Ed. London: CRC Press.
4. Modul Praktikum Teknik Laboratorium. Prodi Biologi-UIN Syarif Hidayatullah Jakarta. 2010.
5. Provan, D. 2018. *Oxford Handbook of Clinical and Laboratory Investigation*. Oxford: Oxford University Press.
6. Turgeon, M.L. 2009. *Immunology & Serology in Laboratory Medicine, 15Ed*. Missouri: Elsevier Inc.

FST6095107 Plant Structure and Development

Module Name	Plant Structure and Development
Module level, if applicable	Basic
Module Identification Code	FST6095107
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Dr. Priyanti, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (3 x 50 min) x 14 wks = 35 h ● Structured activities: 3 x 60 min x 14 wks = 42 h ● Independent study: 3 x 60 min x 14 wks = 42 h ● Exam: 3 x 50 min x 2 times = 5 h; ● Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture

Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course students are able to analyse the morphological and anatomical characteristics of plant organs	
Module content	
1. Concept of structure and development of plants in morphology and anatomy and the relatives with Qur'an 2. Root morphology and function 3. Root anatomy and development 4. Stem morphology and function 5. Stem anatomy and development 6. Leaf morphology and function 7. Leaf anatomy and development 8. Flower morphology and function 9. Flower anatomy and development 10.Fruit morphology and function 11.Fruit anatomy and function 12. Seed morphology and function 13. Seed anatomy and development 14. Review articles about the morphological and anatomical characters of plants per group	
Recommended Literatures 1.Campbell *et al*. 2006. *Biology Concept and Connection*. Pearson Benjamin Cummings. San Francisco.. 2.Anonim. 2022. Botany: Plant Morphology. Kota. Career Point 3.Crang, R., Lyons-Sobaski, S., Wise, R. 2018. Plant Anatomy. The United States of America. Springer	

FST6095108 Practicum Plant Structure and Development

Module Name	Practicum Plant Structure and Development
Module level, if applicable	Basic
Module Identification Code	FST6095108
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology

Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes)
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to analyse information and data on morphology, anatomy, development, and function of plant organs.

Module content

1. Morphology and function of root organs
2. Anatomy and development of root organs
3. Morphology and function of stem organs
4. Anatomy and development of stem organs
5. Morphology and function of leaf organs
6. Anatomy and development of leaf organs
7. Modification of roots, stems, leaves, stem branching form and leaf layout on the stem
8. Morphology and function of floral organs
9. Anatomy and development of floral organs
10. Morphology and function of fruit organs
11. Anatomy and development of fruit organs
12. Morphology and function of seed organs and germination
13. Anatomy and development of seed organs and germination
14. Fieldtrip

Recommended Literatures

1. Foster, Adriance Sherwood, and Ernest M. Gifford. "Comparative morphology of vascular plants." *Comparative morphology of vascular plants.* (1959).
2. Crang, R., Lyons-Sobaski, S., Wise, R. 2018. Plant Anatomy. The United States of America. Springer
3. Nugroho, L.H., Purnomo, I. Sumardi. 2010. Struktur dan Perkembangan Tumbuhan. Penebar Swadaya. Jakarta.
4. International research journals and e-books published less than the last 10 years.

FST6095111 Animal Systematics

Module Name	Animal Systematics
Module level, if applicable	Basic
Module Identification Code	FST 6095111
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Narti Fitriana, M.Si., Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students can understand biological concepts supported by other relevant knowledge to understand developing problems and issues with their applications. Students can apply the biological concept and their applications with relevant knowledge.	
Module content	
1. Introduction, basic concepts of animal taxonomy and rules of scientific nomenclature 2. History and development of animal systematics 3. Porifera and Coelenterata 4. Helminthology I (Platyhelminthes) 5. Helminthology II (Nemathelminthes dan Annelida)	

6. Mollusca 7. Arthropoda 8. Echinodermata 9. Superclass Pisces 10. Amfibi 11. Reptile 12. Aves 13. Mamalia 14. The program application creates a dendogram
Recommended Literatures 1) Mader S. Silvia. 2001. Biology. McGraw Hill. New York. 2) Castro and Huber. 2005. Marine Biology. McGraw Hill. New York.

FST6095112 Practicum Animal Systematics

Module Name	Practicum Animal Systematics
Module level, if applicable	Basic
Module Identification Code	FST6095112
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Narti Fitriana, M.Si., Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV, video
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome
After completing this course, students are able to analyse information and data on morphology, anatomy, cell development, and organ function in animals.
Module content
1.Introduction to animal systematics practicum 2. Phylum Porifera 3. Phylum Coelenterata 4. Helminthology 5. Mollusca 6. Arthropods 7. Echinoderms 8. World of fish 9.Reptiles 10. Amphibians 11. Aves 12. Mammals 13. Field trip 14. Kinship analysis based on similarities-differences character
References 1. Castro & Huber. 2005. Marine Biology. McGraw Hill. New York. 2. De luliis, G & Puler, D. 2005. The Dissection of Vertebrates: A Laboratory Manual. Elsevier. London. 3. Dugatkin, L.A. 2014. Principles of Animal Behavior, 3ed. W. W. Norton & Company, Inc. New York. 4. Hart, P.J.B., & Reynolds, J.D. 2002. Handbook of Fish Biology and Fisheries. Malden: Blackwell Publishing. 5. Modul Praktikum Sistematika Hewan. Prodi Biologi-FST, UIN Syarif Hidayatullah Jakarta. 6. Tortora, G.J., & Derrickson, B. 2009. Principles of Anatomy and Physiology, 12 Ed. Hoboken: John Wiley & Sons, Inc

NAS6112201 Pancasila and Civic Education

Module Name	Pancasila and Civic Education
Module level, if applicable	Undergraduate
Module Identification Code	NAS6112201
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Dr. Gerafina Djohan, MA
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Lecture, class discussion, structured activities (homework, quizzes).
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h Structured activities: 3 x 60 min x 14 wks = 42 h

	Independent study: 3 x 60 min x 14 wks = 42 h Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours ≈ 4.133 ECTS
Admission and examination requirements	• Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	-
Media employed	Board, LCD Projector, Laptop/Computer
Forms of assessment	● Assignments (including quizzes and assignment): 40% ● Midterm exam: 30% ● Final exam: 30%
Intended Learning Outcome	
After completing this course, the students should have: 1. Explaining the History of the Formulation of Pancasila 2. Stressing the Importance of Civic Education as a Platform for Shaping the Character of the Civilized Indonesian Nation 3. Describing the Competency Standards of Civic Education 4. Presenting the Scope of Pancasila and Civic Education Material 5. Concluding the Importance of Civic Education for the Development of a Democratic Culture in Indonesia	
Module content	
1. History of the Formulation of Pancasila 2. Pancasila as a National Ideology 3. Pancasila as a Paradigm for Community, Nation, and State Life 4. Islamic Perspectives on the Content of Pancasila 5. National Identity 6. Globalization 7. Democracy 8. Constitution and Legislation in Indonesia 9. State, Religion, and Citizenship 10. Human Rights (HAM) 11. Regional Autonomy 12. Good Governance 13. Corruption Prevention 14. Civil Society	
Recommended Literatures 1. Ubaedillah, A. 2015. Pendidikan Kewarganegaraan. Jakarta: Prenada Media Group. 2. Endang Saefudin Anshari. 1985. Piagam Jakarta. Pustaka, bandung	

FST6095124 Cell Biology

Module Name	Cell Biology
Module level, if applicable	Basic

Module Identification Code	FST6095124
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si., Arina Findo Sari, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV, video
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students can apply cell biology concepts in biology activities supported by other relevant knowledge to understand developing problems and issues. Students can understand the implementation of cell biology theory in their research	
Module content	
1. Lecture contracts 2. History of the development of cell theory 3. Prokaryotic and Eukaryotic Cells 4. Cell Membrane Structure and Function 5. Nucleus and Ribosomes	

6. Endomembrane System I: Endoplasmic Reticulum and Golgi Body 7. Sistem Endomembran II : Vakuola, Peroksisom, dan Lisosom 8. Mitochondria 9. Chloroplast 10. Cytoskeleton and Cell Motile Structure 11. Cell Cycle 12. Extracellular Matrix and Cell Junctions 13. Cell Communications 14. Journal discussion
Recommended Literatures 1. Albert, B., D. Bray, K. Hopkin, A. Johnson, J. Lewis, M. Raff, K. Robert & D. Watson. *Molecular Biology The Cell.* 3rd edition. Garland Publishing Inc. 2. Karp, G. (2010). Cell and Molecular Biology: Concepts and Experiments. Sixth Edition. New York: John Wiley & Sons Inc. 3. Santoso, L.M, & Santri, D.J. (2016). Biologi Molekuler Sel. Jakarta: Salemba Teknika. 4. Subowo. (2015). Biologi Sel. Jakarta: Sagung Seto. 5. Sumadi & Marianti, A. (2007). Biologi Sel. Yogyakarta: Graha Ilmu. 6. Juwono & Juniarto, A.Z. (2002). Biologi Sel. Jakarta: EGC 7. Yunita, O. (2016). Biologi Sel-Pendekatan Aplikatif untuk Profesi Kesehatan. Jakarta: Erlangga. 8. Wolfe, Stephen L. (1985). *Cell Ultrastructure*. Wadsworth Publishing Company. 9. Reksoatmodjo, S.M Issoegianti. (1993). Buku ajar Biologi Sel. Yogyakarta: UGM.

FST6091101 Introduction to Information and Communications Technology

Module Name	Introduction to Information and Communications Technology
Module level, if applicable	Undergraduate
Module Identification Code	FST6091101
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Mohamad Irvan Septiar Musti, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Lecture, class discussion, structured activities (homework, quizzes).
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam:2 x 50 min x 2 times (mid test and final test) = 3.33 h; ● Total = 82,66 h

	• 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours ≈ 2.755 ECTS
Admission and examination requirements	• Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	-
Media employed	Board, LCD Projector, Laptop/Computer
Forms of assessment	• Assignments (including quizzes and assignment): 40% • Midterm exam: 30% • Final exam: 30%

Intended Learning Outcome

After completing this course

1. Students are able to understand the history, role, and benefits of Information and Communication Technology (ICT).
2. Students are able to explain an overview of computer systems.
3. Students are able to explain the concepts and tasks of operating systems.
4. Students are able to explain the history of Unix, Linux, and Windows operating systems.
5. Students can explain the definition, benefits, and workings of computer networks and the internet.
6. Students are able to explain the processes that occur at the OSI Layer.
7. Students are able to explain the types of IP Addresses and how they work.
8. Students can understand the development of computing and cloud computing.
9. Students are able to explain the architecture, storage media, and security mechanisms in cloud computing.
10. Students have the ability to describe various types of databases and provide explanations regarding the benefits of databases. Additionally, students can identify the uses and practical applications of databases in various industries and sectors.
11. Students have the ability to describe and understand the fundamental concepts of the Data Ecosystem, encompassing various important aspects of data management.
12. Students have the ability to comprehensively explain programming languages. They understand the definition and purpose of programming languages and also comprehend the significant role of programming languages in software development.
13. Students have the ability to comprehensively describe various aspects of cybercrime. They understand the definition of cybercrime, referring to illegal or harmful activities conducted online, including attacks and violations of computer systems and networks.

Module content

1. Introduction: History of the Development of Information and Communication Technology
2. Computer system
3. Operating system
4. Computer Networks and Internet Networks
5. Reference Model (OSI Layer)
6. IP Address Basics
7. Cloud Computing System

8. Architecture, Security Mechanisms and Storage Media in Cloud Computing 9. Database Basics 10. Ecosystem Data 11. Programming language 12. Cyber Crime and Security
Recommended Literatures 1. Bunrap, Pete.et al. (2019). *The Cybersecurity Body of Knowledge. The National Cyber Security Center*. 2. Andrew S Tanenbaum., David J Wetherall.(2011).*Computer Netwrok*. 5th ed. Pearson Education. 3. Andrew S Tanenbaum., Herbert Bos. (2015). *Modern Operating System*. 5th ed. Pearson Education. 4. Andrew S Tanenbaum., Albert S Woodhull. (2006). *Operating System Design and Application*. 3rd ed. Pearson Education. 5. William Stallings. (2012). *Operating System Internal and Design Principles*. 7th ed. Pearson Education. 6. Huawei Technologies Co., Ltd. (2019). *Cloud Computing Technology*. Springer

UIN6033205 Practicum Qira'ah and Worship

Module Name	Practicum Qira'ah and Worship
Module level, if applicable	Basic
Module Identification Code	UIN6033205
Semester(s) in which the module is taught	2
Person(s) responsible for the module	Dr. Saifudin, M.Pd.I.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 150 min) x 14 wks = 70 h • Structured activities: 2x 50 x 14 wks = 23.33 h • Exam: 2x 150 min x 2 (mid test and final test) = 10 h; • Total = 103.33
Credit points	2 Credit Hours = 3.44 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture

Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to :

- Understand the basics, concepts, and theories of Tajweed and Qiraat well and correctly;
- Understand various rules, methods and manners of reading the Quran according to the provisions of Tajweed Science
- Read and memorise Juz 30 and other selected letters orally and in writing
- Understand the basis, concepts and theories of various worship in Islam in accordance with the rules of Jurisprudence and Ushul Fiqh
- Implement knowledge, methods and practices of worship properly and correctly.

Module content

A.Practicum Qiroah

1. The Concept of Hijâiyah Letters: Classification, Types, and Makharij and Characteristics of Letters
2. Al-Qamariyah and al-Syamsiyah
3. Ahkâm al-Nûn al-Sâkinah wa al-Tanwîn
4. Ahkâm al-Mîm al- Sâkinah
5. Idlghâm al-Mutaqâribain wa al-Mutajânisain
6. Ahkâm al-Madûd (1 dan 2)
1. Al-Qalqalah
2. Al-Washl wa al-Waqf
3. Qirâah Gharîbah
4. Types of Qirâat in the al Quran
5. Memorize Juz Amma, Juz 28, Juz 29 and Surah Al-Kahfi, Al-Rahman, Al-Waqi'ah, Al-Mulk, Al Sajdah, Yasin,

B. Practicum Worship

1. The Concept of Worship in Islam
2. Thaharah (Hadas, Uncleanness, Wudlu, Tayamum, Bathing)
3. Concepts and Practices of Dressing According to Islam
4. Dhikr and Prayer
5. Obligatory Prayers (5 Times Prayer, Jama' and Qashar, Prayer in the Vehicle and Khauf)
6. Sunnah prayers (Rawatib, Tahajjud/Tarawih, Dluha, Istikharah, Istisqo, Kusuf/Khusuf)
7. Tajhiz al-Janazah (Pre-Death, Tajhiz al-Janazah Process: Bathing, Shrouding, Praying and Burying, and related matters)
8. Zakat/Alms (Compulsory and Sunnah)
9. Fasting (Compulsory, Sunnah and Haram)

10. Hajji and 'Umrah 11. Marriage and Family in Islam 12. Eating, Drinking and Communicating Manners 13. Mu'amalah (Types of Business in Islam)
Recommended Literatures **A.Practicum Qiroah** *1. Al-Quran al-Karim* 2. Muna al-Baitîi, 1438 H. *Al-Tajwîd al-Mustawâ al-Awwal*. *3.* ’Abdul Qâdir, ’Abdullah Hailuz, 2008. *Al-Muyassar al-Mufîd fi ’Ilm al-Tajwîd*, (Yordan). **C. Practicum Worship** *1. A-Quran al-Karim* *2. Al-Kutub al-Sittah (Shahih al-Bukhari, Shahih Muslim, Sunan al-Tirmidzi, Sunan al-Nasai, dan Sunan Ibn Majah)* *3.* Ibn Hajar al-’Asqalani, 2000. *Bulûgh al-Marâm min Adillat al-Ahkam,* Riyadl: Dar al-Athlas li al-Nasyr wa al-Tawzi’. 4. Ibn Hisyam*,* Abu Muhammad Abd al-Malik*,2002. al-Sirah al-Nabawiyah,* Kairo: Dar al-Ghad al-Jadid. *5.* Ibn Rusyd, 2004. *Bidayah al-Mujtahid wa Nihayah al-Muqtashid,* Kairo: Dar al-Hadis. 6. al-Jaziri, Abu Bakar Jabir. 2004. *Aqidah al-Mu’min*, Madinah: Maktabah al-’Ulûm wa al-Hikam.

FST6095103 Basic Ecology

Module Name	Basic Ecology
Module level, if applicable	Basic
Module Identification Code	FST6095103
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (3 x 50 min) x 14 wks = 35 h ● Structured activities: 3 x 60 min x 14 wks = 42 h

	• Independent study: 3 x 60 min x 14 wks = 42 h • Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

1. Students are able to explain the background of ecology and the development of ecological science
2. Students are able to explain the concepts of environmental ecology, plant ecology and animal ecology
3. Students are able to master the thermodynamic principles of ecosystems and their constituent components
4. Students are able to describe methods for measuring and analyzing ecosystems
5. Students are able to analyze ecosystem problems with their expertise in the field of biology to develop their commitment to environmental conservation in an effort to create an independent, honest and tough character.
6. Students are able to communicate the results of ecological research effectively both orally and in writing
7. Able to make decisions based on ecological data as a form of responsibility in carrying out tasks

Module content

1. Basic concepts of ecosystems
2. The process of forming an ecosystem and the distribution of species in the ecosystem
3. Energy in ecosystems
4. Biogeochemical Cycles
5. Law of tolerance and limiting factors
6. Ecosystem types
7. Population and community
8. Interspecific and intraspecific interactions
9. Plant ecology
10. Animal Ecology and animal behavior
11. Biogeography

Recommended Literatures

1. Cox,WG. 2002. General Ecology. Laboratory Manual. Mc.Graww Hill.
2. Odum, E.P. 1971. Fundamental of Ecology. Toppan company Ltd. Tokyo.
3. Krebs JR & Davies NB. 1989. Behavioural ecology.An Evolutionary Approach. Black is a scientific publication.
4. Setiadi,Dede. Puspo Dewi.T. 1989. Dasar dasar Ekologi. IPB.Bogor.

5. Soerianegara,I. Dan Andry Indrawan. Ekologi Hutan Indonesia. IPB.Bogor.
6. Wirakusumah,Sambas. 2003. Dasar Dasar Ekologi. UI.Jakarta.

FST6095104 Practicum Basic Ecology

Module Name	Practicum Basic Ecology
Module level, if applicable	Basic
Module Identification Code	FST6095104
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV

Intended Learning Outcome

- Students are able to explain the background of ecology and the development of ecological science
- Students are able to explain the concepts of environmental ecology, plant ecology and animal ecology
- Students are able to use tools to measure environmental abiotic factors
- Students are able to describe methods for measuring and analyzing ecosystems
- Students are able to analyze ecosystem problems with their expertise in the field of biology to develop their commitment to environmental conservation in an effort to create an independent, honest and tough character.
- Students are able to communicate the results of ecological research effectively both orally and in writing

● Able to make decisions based on ecological data as a form of responsibility in carrying out tasks
Module Content
1. Physical Chemical Factors 2. Decomposer Population 3. Soil Macro Fauna 4. Carbon Cycle 5. Intraspecific and Interspecific Competition 6. Allelopathy 7. Secondary Succession 8. Vegetation Analysis 9. Profile Diagram 10. Animal Populations and Communities I (Mammals) 11. Animal Populations and Communities II (Birds)
Recommended Literatures 1. Altmann J. 1973. *Observational Study of Behavior: Sampling Methods*. University of Chicago. Chicago. 2. Baker JP dan JS Wilson. 1999. A Quantitative Technique for the Identification of Canopy Stratification in Tropical and Temperate Forest. *Journal of Forest Ecology and Management*. 127(2000):77-86. 3. Bardgett RD. 2005. *The Biology of Soil: A Community and Ecosystem Approach*. Oxford University Press. xi+232 pp. 4. Bianchet MF dan M Apollonio. 2003. *Animal Behavior and Wildlife Conservation*. Island Press. London. 5. Bibbi C, M Jones, S Marsden. 1998. *Expedition Field Techniques Bird Surveys*. The Expedition Advisory Centre. London.. 6. Richards PW. 1996. *The Tropical Rain Forest*. Cambridge University Press, Chambridge. UK. 7. Rizvi SGH dan V. Rizvi. 1992. *Allelopathy: Basic and Applied Aspects*. Chapman and Hall. London. 8. Scheiner SM. 2003. Six Types of Species-Area Curves. *Journal of Global Ecology and Biogeography*. 12:441-447. 9. Setiadi D, Muhadiono, A Yusron. *Penuntun Praktikum Ekologi*. PAU Ilmu Hayat IPB. Bogor. 10. Southwood TRE dan PA Henderson. 2000. *Ecological Methods*. Third Edition. Blackwell Science Ltd. xi+565 pp. 11. Sutherland JM, I Newton, RE Green. 2004. *Bird Ecology and Conservation*. Oxford University Press Inc. New York.

FST6095144 Genetics

Module Name	Genetics
Module level, if applicable	Basic
Module Identification Code	FST6095144
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Fahri Fahrudin, M.Si.

Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	- Lecture (class): (3 x 50 min) x 14 wks = 35 h - Structured activities: 3x60 min x 14 wks= 42 h - Independent study: 3x60 min x 14 wks = 42 h - Exam: 3 x 50 min x 2 times = 5 h; - Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course,

- Students are able to analyse the diversity of plants and animals both within the same species and family.
- Students are able to test the concept of mendelism of observation results against the theory of chance, the Khi Kuadrat test, and the applicability of the Hardy-Weinberg Law to a population.

Module content

1. Basic concepts of genetics
2. Hereditary characteristics
3. Gene expression
4. Mendelism
5. Probability and Chi-Square tests
6. Mendel's Law Deviations (multiple alleles, gene interactions, lethal genes) extrachromosomal DNA and its inheritance
7. Sex determination and sex-linked
8. Gene and chromosomal mutations

9. Linkage, crossing over and recombination 10. Genetic mapping 11. Population genetics 12. Special topics on genetic phenomena 13. Special topics on applications of genetics
Recommended Literatures 1. Gardn er, E.J., dkk. 1991. Principle of Genetic. New York: Chichester-Brisbane-Toronto-Singapore: John Wiley and Sons Inc. 2. Stansfield WD. 1983. Schaum's Outline of Theory and Problems of Genetics. New York: McGraw-Hill. 3. Suryo. 2005. Genetika Manusia. Cetakan 8. Yogyakarta: Gadjah Mada University Press. 4. Suryo. 1990. Genetika. Cetakan 6. Yogyakarta: Gadjah Mada University Press.. 5. Yatim. W. 2003. Genetika. Bandung: Tarsito. 6. Wang er, R.P. dkk. 1980. Introduction to Modern Genetics. New York: John Wiley & Sons Inc. 7. Hartan a, A. 1992. Genetika Tumbuhan. PAU Ilmu Hayati IPB. 8. Yusuf, M. 2001. Genetika I Struktur & Ekspresi Gen. Sagung Seto, Jakarta

FST6095115 Practicum Genetics

Module Name	Practicum Genetics
Module level, if applicable	Basic
Module Identification Code	FST6095115
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Fahri Fahrudin M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome
1. Students are able to analyze the diversity of plants and animals both within the same species and family 2. Students are able to test the concept of mendelism as a result of observations of probability theory, the Chi-Square test, and the application of the Hardy-Weinberg Law to a population.
Module content
1. Recognizing the Diversity of Characteristics of Living Creatures. 2. Probability Theory and Chi-Square Test. 3. Monohybrid Experiment Analogy 4. Analogy of Mendel's Dihydride Experiment. 5. Making and Observing Plant Chromosome Specimens 6. Observation and Observation of Animal Chromosome Specimens. 7. Making Eukaryotic Chromosome Karyotypes and Recognizing Human Fingerprints. 8. Life Cycle and Sex Ratio of Fruit Flies. 9. Mutation. 10. Hardy Weinberg's Law. 11. Multiple Alleles and Gene Frequency Determination. 12. Introduction to Polymerase Chain Reaction PCR) 13. Introduction to Electrophoresis. 14. Observation of Giant Chromosomes (Polytene Chromosomes).
Recommended Literatures 1. Crowder. (1997). *Genetika tumbuhan*. Diterjemahkan oleh: Lilik Kusdiarti. Jogjakarta: Gajah Mada University Press. 2. Jamilah. (2005). Pengaruh berbagai macam detergen, penambahan garam dan ekstrak nanas *(Ananas comusus)* terhadap hasil isolasi DNA berbagai macam buah sebagai topik praktikum mata kuliah genetika (Skripsi tidak diterbitkan). Program Sarjana Biologi, Malang. 3. Klug, W. S., & Cummings., M. R. (1991). *Concepsta of genetics*. New York: Mac Millan Pub. Co. 4. Norhadi, M. B. (1984). *Genetika dasar*. Bandung: Armico. 5. Snustad, D. P., Simmons, M. J., & Jenkins, J. B. (1997). *Principle of genetics*. New York: John Willey & Sons Inc. 6. Suroyo. (2001). *Genetika strata 1*. Jogjakarta: Gajah Mada University Press. 7. Winchester, A. M. (1991). *Laboratory manual of genetics*. Dubuque-Iowa: Wm. Brown.

FST6095106 Basic Microbiology

Module Name	Basic Microbiology
Module level, if applicable	Basic
Module Identification Code	FST6095106
Semester(s) in which the module is taught	3

Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si., Dr. Nani Radiastuti, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (3 x 50 min) x 14 wks = 35 h ● Structured activities: 3 x 60 min x 14 wks = 42 h ● Independent study: 3 x 60 min x 14 wks = 42 h ● Exam: 3 x 50 min x 2 times = 5 h; • Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Able to understand organisms that include within the scope of microbiology and able to carry out research activities related to microbiology	
Module Content	
1. History and development of microbiology throughout time 2. Characterization of microorganisms: prokaryotic and eukaryotic cell structure 3. Basic methods in microbiology 4. Structure and development of Bacteria 5. Structure and development of the Archaea 6. Structure and development of Microalgae 7. Structure and development of Viruses 8. Structure and development of Fungi 9. Control the growth of microorganisms 10. Interaction of microorganisms 11. Bioprocess 12. Applied microbiology in the food and industrial sector 13. Applied microbiology in the field of environment and health	

Recommended Literatures

1. Madigan, M. T., Martinko, J. M., Stahl, D. A., Clark, D. P. 2012. Brock Biology of Microorganisms. 13th Edition.
2. Whitman, W. B., Coleman, D. C., & Wiebe, W. J. (1998). Prokaryotes: the unseen majority. Proceedings of the National Academy of Sciences, 95(12), 6578-6583
3. Cappuccino, J. G., & Sherman, N. (2005). Microbiology: a laboratory manual.
4. Watkinson, S. C., Boddy, L., & Money, N. (2015). The fungi. Academic Press.
5. Shors, T. (2017). Understanding viruses. Jones & Bartlett Publishers.
6. Cavalier-Smith, T. (1993). Kingdom protozoa and its 18 phyla. Microbiological reviews, 57(4), 953-994.
7. Becker, E. W. (1994). Microalgae: biotechnology and microbiology (Vol. 10). Cambridge University Press.

FST6095117 Practicum Basic Microbiology

Module Name	Practicum Basic Microbiology
Module level, if applicable	Basic
Module Identification Code	FST6095117
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si., Dr. Nani Radiastuti, M.Si, Arina Findo Sari, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit Points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are sble to master the principles and techniques used in the field of basic microbiology	
Modul Content	

1. Lecture contract & introduction to laboratory K3, principles in basic microbiology practicum
2. Basic preparation and treatment in microbiology I
3. Basic preparation and treatment in microbiology II: Inoculation
4. Making dry preparations and staining bacterial cells.
5. Movement of bacteria
6. Enumeration using the turbidimetry method and growth curve of microorganisms.
7. Enumeration using the TPC method and growth curve of microorganisms
8. The influence of environmental factors on the cultivation of microorganisms.
9. Biochemical activity of microorganisms.
10. Control of microorganisms.
11. Isolation of microorganisms from the environment.
12. Water microbiology: Standard qualitative analysis using the MPN method
13. Food microbiology: Making sticky rice tape, tempeh and nata de coco
14. Review practical reports

Recomended Literatures

1. Pikoli, M. R., Radiastuti, N., Bahri, S., Solihat, N. A. (2012). Penuntun praktikum mikrobiologi dasar. Jakarta:Program Studi Biologi Fakultas Sains dan Teknologi Universitas Islam Negeri Syarif Hidayatullah
2. Aryantha, N. I. (2000). Pedoman praktikum mikrobiologi. Bandung: Jurusan Biologi FMIPA ITB.
3. Cappucino, J. G., & Sherman. N. (1996). Microbiology: a laboratory manual. fourth edition. California: The Benjamin/Cummings Publishing Company, Inc.
4. Gandjar, I. Dkk. (1998). Pedoman praktikum mikrobiologi. Universitas Indonesia.
5. Hadioetomo, S. R. (1990). Mikrobiologi dasar dalam praktek. Jakarta: Gramedia.
6. Pelczar, M. J., & Chan, E.S.C. (1977). Laboratory exercise in microbiology fourth edition. New York: McGraw-Hill.
7. Ratnawati., & Safitri, R. (1992). Petunjuk praktikum mikrobiology dasar. Jatinangor: Jurusan Biologi FMIPA UNDAP.
8. Seeley, H. W, Jr., & VanDemark, P. J. (1962). Microbes in action: a laboratory manual of microbiology second edition. San Fransisco: W.H. Freeman and Company.
9. Sunatmo, T. I. (2007). Eksperimen mikrobiology dalam laboratorium. Jakarta: Ardy Agency.
10. Tim Penyusun Laboratorium Laboratorium Mikrobiologi. (2008). Petunjuk praktikum mikrobiology dasar. Purwokerto: Fakultas Biologi Universitas Jenderal Soedirman.
11. Wistreich, G. A., & Lechtman. M. D. (1984). Laboratory exercise in microbiology fifth edition. New York: MacMillan.

FST6095128 Plant Systematics

Module Name	Plant Systematics
Module level, if applicable	Basic

Module Identification Code	FST6095128
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Priyanti, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 x 60 min x 14 wks = 28 h ● Independent study: 2 x 60 min x 14 wks = 28 h ● Exam: 2 x 50 min x 2 times = 3,33 h; Total = 82,66 hours
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	none
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course students are able to analyse plant diversity based on morphological and evolutionary traits.	
Module content	
1. The systematics concepts, taxonomy, properties and characteristics, their relationship with other sciences, and the holy Qur'an 2. History of taxonomy 3. Description, identification and classification 4. Diversity of micro and macroalgae and their evolution 5. Bryophyte diversity, life cycles, and evolution 6. Diversity of Lichens and their benefits 7. Pteridophyta diversity, life cycle, and evolution 8. Gymnosperm diversity and evolution 9. Diversity, properties and characteristics of Magnoliids 10. Diversity, properties and characteristics of Commelinids 11. Diversity, properties and characteristics of Fabids	

12. Diversity, properties and characteristics of Malvids 13. Diversity, properties and characteristics of Campanulids 14. Diversity, properties and characteristics of Lamiids.
Recommended Literatures 1. [APG] Angiosperms Phylogeny Group. 2016. An update of the angiosperm phylogeny group classification for the orders and families of flowering plant: APG IV. Botanical Journal of the Linnaean Society, 181, 1–20. 2. Bellinger EG, Sigee DC. 2015. Fresh Water Algae. Oxford: John Wiley & Sons, Ltd 3. Articles from research on the latest plant systematics

FST6095109 Practicum Plant Systematics

Module Name	Practicum Plant Systematics
Module level, if applicable	Basic
Module Identification Code	FST6095109
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Priyanti, M.Si., Ardian Khairiah, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to analyse plant diversity in oral and written form.	

Module content
1. The concept of plant taxonomy, diversity and character variations 2. Morphological Diversity of Microalgae 3. Morphological Diversity of Macroalgae. 4. Morphological diversity of mosses (Bryophyta). 5. Lichen morphological diversity 6. Morphological diversity of Pteridophytes 7. Diagnostic characteristics of plants 8. Comparison of plant morphology. 9. Key to plant identification. 10. Anatomical characteristics of plants. 11. Palynological characteristics of plants 12. Morphological Diversity of Gymnosperms 13. Morphological Diversity of Angiosperms 14. Herbarium techniques
Recommended Literatures 1. Angiosperms Phylogeny Group. 2016. An update of the angiosperm phylogeny group classification for the orders and families of flowering plant: APG IV. Botanical Journal of the Linnaean Society, 181, 1–20. 2. Bellinger EG, Sigee DC. 2015. Fresh Water Algae. Oxford: John Wiley & Sons, Ltd 3. Singh, G. 2010. Plant Systematics. Science Publishers, New Delhi India

FST6095110 Animal Structure and Development

Module Name	Animal Structure and Development
Module level, if applicable	Basic
Module Identification Code	FST 6095110
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Narti Fitriana, M.Si., Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (3 x 50 min) x 14 wks = 35 h

	● Structured activities: 3 x 60 min x 14 wks = 42 h ● Independent study: 3 x 60 min x 14 wks = 42 h ● Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students can understand biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students take an active role in developing science and technology throughout their lives.

Module content

1. Biology cell and spectrum concept
2. Basic tissue structure and histology
3. Structure and histology of the integumentary system and its derivatives
4. Structure and histology of the musculoskeletal system (muscles and skeleton)
5. Structure and histology of the digestive system, digestive organs and glands
6. Structure and histology of the circulatory, respiratory and excretory systems
7. Structure and histology of the reproductive system
8. Gametogenesis, structure and development of sperm and ovum and integration of Islamic values
9. Primate reproductive cycle
10. Fertilization and implantation
11. Extra-embryonic membranes and twinning
12. Development of invertebrate animal embryos (Echinodermata)
13. Pisces embryo development, amphibians and reptiles
14. Embryonic development of Aves and Mammalia

Recommended Literatures

1. Campbell *et al*. 2006. *Biology Concept and Connection*. Pearson Benjamin Cummings. San Francisco.
2. Hildebrand, Milton. 1995. *Analysis of Vertebrate Structure.* 4th-ed. John Wiley & Sons. Inc. New York.
3. Mader, S. S.2001. Understanding human anatomy and physiology. Mc.Graw-Hill Companies. Amerika Utara
4. Gilbert, S.F. 2003. Developmental Biology. Sinauer. USA
5. Carlson, B.M. 1996. *Patten's Foundation of Embryology*. Mc Graw-Hill. New York
6. Jurnal penelitian internasional dan e-book terbitan kurang dari 10 tahun terakhir

FST6095129 Practicum Animal Structure and Development

Module Name	Practicum Animal Structure and Development
Module level, if applicable	Basic
Module Identification Code	FST6095129
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Narti Fitriana, M.Si.,
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white/glass board and PowerPoint presentation with LCD/smart TV
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to analyze information and data on morphology, anatomy, cell development and organ function in animals	
Module content	
1. Basic concepts of the structure and development of animal cells 2. Basic tissue 3. Integumentary system, structure of scales, feathers and skin 4. Muscle and skeletal tissue 5. Anatomical structure and morphology of Osteichthyes 6. Anatomical structure and morphology of Amphibians 7. Anatomical structure and morphology of Reptiles	

8. Anatomical structure and morphology of Aves 9. Anatomical structure and morphology of Mammalia 10. Anatomical structure and development of the ovaries 11. Anatomical structure and development of the testicles 12. Anatomical structure and development of the sea urchin embryo 13. Anatomical structure and development of frog embryos 14. Anatomical structure and development of chicken embryos
Recommended Literatures 1. De Iuliis G and Plurela D. 2007. *The Dissection of Vertebrates*. Academic Press. London, UK. 2. Gilbert SF. 2013. *Developmental Biology* 10_{Ed}. Sinauer Associates. Swarthmore College. USA. 3. Klein RM and Enders GC. 2007. *Anatomy, Histology, and Cell Biology* 3_{Ed}. MecGraw Hill. USA.

FST6095128 Biochemistry

Module Name	Biochemistry
Module level, if applicable	Basic
Module Identification Code	FST6095128
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Dr. Laode Sumarlin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to understand biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to work independently and in teams according to their skills. Students are able to demonstrate the results of conceptual, analytical, logical and innovative thinking in oral and written form.	
Module content	
1. Understanding Biochemistry 2. Water and buffer 3. Biomolecules in Cells/Cell Organelles 4. Carbohydrate 5. Lipid 6. Amino Acids and Proteins 7. Enzyme 8. General Aspects of Metabolism (Cross-Metabolism and Metabolism Regulation) 9. Glycolysis and the Citric Acid Cycle 10. Gluconeogenesis and glycogen metabolism 11. Lipid metabolism (Oxidation of fatty acids and biosynthesis of fatty acids, fats and cholesterol) 12. Amino Acid Metabolism and amino acid proteins)	
Recommended Literatures 1. Sumarlin, L. 2020. BIOKIMIA: Dasar-Dasar Biomolekul dan Metabolisme, Raja Grafindo, Jakarta 2. Lehninger, A.L. 2000. Dasar-Dasar Biokimia. Terjemahan : Maggy Thenawijaya. Erlangga. Jakarta. 3. Stryer, L. 1988. Biochemistry 3rd ed. Freeman. San Francisco 4. Voet, D & J.G. Voet. Biochemistry 2nd ed. Wiley. New York	

FST6096226 Practicum Biochemistry

Module Name	Practicum Biochemistry
Module level, if applicable	Basic
Module Identification Code	FST6096226
Semester(s) in which the module is taught	3
Person(s) responsible for the module	Tarso Rudiana, M.Si

	Nurul Amilia, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes)
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

- After attending this lecture:
- Students are able to explain the use of biomolecules contained in the Qur'an and Hadith.
- Students are able to understand the basic principles related to the isolation, characterisation and biosynthesis of primary metabolites (carbohydrates, lipids, and proteins).
- Students have the skills to use experimental tools related to biochemical experiments.
- Students are able to make reports in accordance with correct scientific principles.
- Students are able to directly prove biochemical theories, phenomena/reactions through experimental activities.
- Students are able to develop understanding and thinking skills in designing biochemical experiments for research activities.

Module content

1. Qualitative Analysis
2. Carbohydrate Hydrolysis
3. Qualitative Analysis of Lipids
4. Qualitative Analysis of Protein I
5. Qualitative Analysis of Protein II
6. Temperature characteristics of Amylase Enzyme
7. pH characteristics of Amylase Enzyme
8. Kinetics of Amylase Enzyme

Recommended Literatures

- Mathew C.K. & van Holde K.E., 1996, Biochemistry, 2nd edition,Benjamin/Cummings Publishing Company, USA.
- Devlin M. Thomas, 1997, Textbook of Biochemistry, 4th edition, John Wiley & Sons, Inc., USA.
- Lehninger, L. Albert, 1982, Principles of Biochemistry, Worth Publisher, Inc., USA.
- James D. & Howland K., 1997, Protein Purification and Analysis, Research school of Biosciences, University of Kent Canterbury, UK.
- Lewin B., 1997, Genes VI, First edition, Oxford University Press Inc., New York, USA.
- Anna Poedjiadi, 1994, Dasar-dasar Biokimia, UI-Press, Jakarta.

FST6094106 Elementary Statistics

Module Name	Elementary Statistics
Module level, if applicable	Basic
Module Identification Code	FST6094106
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation

Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to master the concept of statistics with the approach of various problems in Biology research and can then be used to process their research data.	
Module content	
1.Statistics concept 2. Variables and Data 3. Frequency distribution 4. Central value measurement 5. Dispersion measurement 6. Normal distribution 7. Hypothesis test 8. Chi-Square Distribution 9. Simple correlation and regression 10. Correlation and multiple regression 11.ANOVA: Completely Randomized Design and Randomized Block Design 12. ANOVA: Factorial and Advanced Test (Duncan Test)	
Recommended Literatures 1. Lily Surayya Eka Putri. 2019. Biostatistik. FST-UIN Syarif Hidayatullah Jakarta. 2. Anto Dajan. 2000. Pengantar Metode Statistik jilid 1 & 2. 3. Artikel-artikel dalam jurnal-jur	

FST6095132 Conservation Biology

Module Name	Conservation Biology
Module level, if applicable	Basic
Module Identification Code	FST6095132
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si., Etyn Yunita, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h

	• Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Able to explain the background and history of the conservation movement, conservation ethics, and the concept of nature conservation in Islam. Able to categorize biodiversity, conservation species, and conservation areas. Able to describe threats to biodiversity. Able to explain conservation area planning, conservation priorities, and national international conservation strategies

Module content

1. Background to the conservation movement, figures from the Conservation Movement and their contributions
2. Conservation ethics
3. The concept of nature conservation in Islam
4. Biodiversity and biodiversity value
5. Threats to biodiversity
6. Conservation of species
7. Conservation priorities
8. Conservation Area Planning
9. National and international conservation strategies
10. Cost-benefit analysis of conservation areas
11. Consideration of area legalization
12. Local wisdom

Recommended Literatures

1. Wijayanti, F. 2015. Biologi Konservasi. UIN Press. Jakarta
2. Primack,R,B,. Supriatna,J. Indrawan & Kramadibrata. 1998. Biologi Konservasi. Yayasan Obor ndonesia.
3. Mangunjaya.F.M. 2005. Konservasi Alam Dalam Islam . Yayasan Obor Indonesia.
4. Caughley.G, Gunn.Anne,. 1995. Conservation Biology In Theory and Practice. Blackwell Science.

5. Frankel.O.H. and Michael E.S. 1997. Conservation and Evolution. Cambridge University Press.
6. Keraf Sony A.2006. Etika Lingkungan. Penerbit Buku Kompas.

FST6095113 Microbial Physiology

Module Name	Microbial Physiology
Module level, if applicable	Basic
Module Identification Code	FST6095113
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si., Arina Findo Sari, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	

Students are able to understand microbial physiology which is supported by other relevant knowledge to carry out microbiology applications/research. Students are able understand to condition in bioprocess
Module content
1. Lecture contract and explanation of independent assignments 2. Structure and function of subcellular organs of microorganisms 3. Tools for bacterial movement 4. Microbial genetic processes 5. Microbial growth 6. Microbial stress response 7. Carbon metabolism 8. Other carbon metabolism 9. Lipid metabolism 10. Nitrogen metabolism 11., Differentiation and Qourum sensing 12. Environmental factors that influence initial microbial growth and reproduction 13. Application example (journal review) 14. Application example (journal review)
Recommended Literatures 1. Alexopoulus, J.C. dan Mims, C.W. 1907. Introductory Mycology. John Willey & Sons New York 2. Ingraham, J.L. & C.A. Ingaraham, 2004. Introduction to Microbiology. A case History Approach. Trird Edition. Thomson. USA 3. Moat, A.G. & J.W. Foster, 2002. Microbial Physiology. Fourth Edition. Wiley-Liss.Canada 4. Purwoko Tj, 2007. Fisiologi mikroba. Bumi Aksara. Jakarta

FST6095114 Animal Physiology

Module Name	Animal Physiology
Module level, if applicable	Basic
Module Identification Code	FST6095114
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Narti Fitriana M.Si., Fahri Fahrudin, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.

Workload	• Lecture (class): (3 x 50 min) x 14 wks = 35 h • Structured activities: 3 x 60 min x 14 wks = 42 h • Independent study: 3 x 60 min x 14 wks = 42 h • Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours 124/30= 4,1333
Credit points	3 Credit Hours (2-3) ≈ 4,1333 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

1. Able to analyze the basic concepts of animal physiology including homeostasis, thermoregulation, osmoregulation and the working mechanisms of organ systems in the animal
2. Able to describe and explain how organ systems work in the animal
3. Able to correlate organ system processes working in an animal's body with environmental factors

Module content

1. The scope of physiology (between form, structure and function)
2. Basic concepts of homeostasis
3. Thermoregulation, hibernation, torpor, and estivation.
4. Digestion System 1
5. Digestive System 2
6. Circulation/cardiovascular system
7. Respiration system
8. Osmoregulation and urination
9. Immune system/immunity
10. Endocrine/hormonal system
11. Reproductive system
12. Nervous system
13. Movement system (skeletal and muscular)
14. Sense system (sensory mechanism)

Recommended Literatures

1. Campbell, N.A., et al. 2008. *Biologi, edisi kedelapan jilid 3*. Jakarta: Erlangga.
2. Isnaini, W. 2006. *Fisiologi Hewan*. Yogyakarta: Penerbit Kanisius.
3. Randall, D., Burggren, W., & French, K. 2000. *Eckert Animal Physiology: mechanisms and adaptation.* New York: WH Freeman and Company.

4. Sherwood, L. 2010. *Human Physiology: From Cells to System, 7ed.* Singapore: CENGAGE Learning.
5. Tortora, G.J., & Derrickson, B. 2009. *Principles of Anatomy and Physiology, 12 Ed*. Hoboken: John Wiley & Sons, Inc.
6. Urry, L.A., Cain, M.L. Wasserman, S.A., Minorsky, P.V., & Reece, J.B. *Campbell Biology, 7Ed*. New York: Pearson.

FST6095135 Practicum Animal Physiology

Module Name	Practicum Animal Physiology
Module level, if applicable	Basic
Module Identification Code	FST6095135
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Narti Fitriana, M.Si., Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to analyse information and data arising from animal physiology activities.	
Module content	
1. Basic concepts of animal physiology 2. Homoiotherm thermoregulation 3. Poikilotherm thermoregulation 4. Calculation of the number of erythrocytes and HB levels 5. Leukocyte counting and blood coagulation 6. Cytosol and diastole measurements 7. Osmoregulation 8. Measurement of CO2 molecules resulting from respiration	

9. Sensory and motor tests 10. Check fat levels 11. Liver function examination (liver enzyme levels) 12. Blood glucose levels 13. Urine glucose levels 14. Mini research/base case (independent observation of animal physiology)
Recommended Literatures 1. Hart, P.J.B., & Reynolds, J.D. 2002. *Handbook of Fish Biology and Fisheries*. Malden: Blackwell Publishing. 2. Isnaini, W. 2006. *Fisiologi Hewan*. Yogyakarta: Penerbit Kanisius. 3. Modul Praktikum Fisiologi Hewan. Prodi Biologi-FST, UIN Syarif Hidayatullah Jakarta. 2010. 4. Tortora, G.J., & Derrickson, B. 2009. *Principles of Anatomy and Physiology, 12 Ed*. Hoboken: John Wiley & Sons, Inc. 5. Sherwood L. 2006. *Fisiologi Manusia: dari sel ke sistem. Edisi 6*. Jakarta: Penerbit EGC. 6. Klein RM and Enders GC. 2007. *Anatomy, Histology, and Cell Biology 3$_{Ed}$*. McGraw Hill. USA

FST6095116 Plant Physiology

Module Name	Plant Physiology
Module level, if applicable	Basic
Module Identification Code	FST6095116
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (3 x 50 min)x 14 wks = 35h Structured activities: 3 x 60 min x 14 wks = 42 h Independent study: 3 x 60 min x 14 wks = 42 h Exam: 3 x 50 min x 2 times = 5 h; Total = 124 hours
Credit points	3 Credit Hours (2-3) ≈ 4.133 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to analyse cases related to plant physiology based on the concept of plant physiology.

Module content

1. Introduction: concepts of plant physiology, plant cells, energy and enzymes.
2. Transport and translocation of water and solutions: properties of water, diffusion, osmosis, role of water for plants, absorption and transport of water and transpiration
3. Nutrients and their transportation
4. Assimilation of nutrients: nitrogen, sulfur and phosphate.
5. Photosynthesis: light reactions, dark reactions, translocation in phloem.
6. Respiration and lipid metabolism: respiration, glycolysis, citric acid cycle, electron transport and ATP synthesis, and lipid metabolism
7. Secondary metabolism and its role.
8. Growth and development: embryogenesis, differentiation, organogenesis, dormancy and germination, and juvenile phase, physiology of flower formation, ABC modeling in flower formation, and fruit and seed formation.
9. Growth and development: physiology of flowering formation, ABC modeling in flower formation, fruit and seed formation.
10. Plant growth regulator.
11. Ecophysiology: photoperiodism, vernalization and stress physiology.
12. Applications of plant physiology in other fields.
13. Cases related to plant physiology in other fields

Recommended Literatures

1. Hopkins, W. G. & Norman, P.A (2008). *Introduction to plant physiology.* John Wiley & Sons, Inc. USA
2. Lambers, H., Chapin, F.S.&Pons, T.L, R. E. (2008). *Plant Physiology Ecology*. Springer Science Business Media, LLC, 233 Spring Street, New York, USA
3. Taiz, Lincoln & Eduardo Zeiger. 2003. Hardcover, Plant Physiology, 3rd ed, Sinauer Associates
4. Bhatla, S.C. & Lal, M.A. (2018). *Plant Physiology, Development and Metabolism.* Springer Nature Singapore Pte Ltd. Singapore
5. International research journals and e-books published less than the last 10 years.

FST6095127 Practicum Plant Physiology

Module Name	Practicum Plant Physiology

Module level, if applicable	Basic
Module Identification Code	FST6095127
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to use standard methodologies and software to solve problems related to biology and their implementation. Students are able to interpret research data.

Module content

1. Introduction: K3 in the plant physiology laboratory
2. Solution.
3. Diffusion, osmosis and imbibition processes.
4. Germination and dormancy and influencing factors.
5. The relationship between plants and water.
6. Respiration in plants
7. Photosynthesis
8. Plant hormones
9. Enzyme
10. Growth and development.
11. Plant nutritional needs and deficiencies.
12. Transpiration and factors of transpiration

Recommended Literatures

1. Hopkins, W. G. & Norman, P.A (2008). *Introduction to plant physiology.* John Wiley & Sons, Inc. USA
2. Lambers, H., Chapin, F.S.&Pons, T.L, R. E. (2008). *Plant Phisiology Ecology*. Springer Science Business Media, LLC, 233 Spring Street, New York, USA

3. Taiz, Lincoln & Eduardo Zeiger. 2003. Hardcover, Plant Physiology, 3rd ed, Sinauer Associates
4. Bhatla, S.C. & Lal, M.A. (2018). *Plant Physiology, Development and Metabolism.* Springer Nature Singapore Pte Ltd. Singapore
5. Jurnal-jurnal penelitian internasional dan e-book terbitan kurang dari 10 tahun terakhir.

UIN6032202 Islam and Science

Module Name	Islam and Science
Module level, if applicable	Basic
Module Identification Code	UIN6032202
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Saifudin, MPd.I
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h • Presentation and discussion: 6 h • Structured activities: 3 h x 14 wks = 42 h • Independent study: 3 h x 14 wks = 42 h • Exam: lecture 2 h x 2 times = 4 h; • Total = 129 hours
Credit points	3 Credit Hours (2-3) ≈ 3.99 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	

Students are able to master the concepts, theories and principles of Islamic teachings and its branches in depth. Students are able to understand the sources, history, position, and values as well as the methodology of Islamic religious teachings. Students are able to analyze the history, theory, methodology and value of Islamic sciences in order to develop holistic Islamic thinking. Students are able to integrate the values of Islamic teachings and science in social life and academically.

Module content

1. Introduction, Learning: History, Object/Scope, Objectives, and Methodology of Islamic and Science Courses
2. Humans, the Universe, and Islam and Their Relations
3. Islam: Religion, Philosophy, Science, and Civilization
4. Soul, Heart, Reason and Knowledge: Position, Relationship and Process and Formation of Knowledge
5. The Concept of Science in Islam: Definition, Source, Methodology, Object of Study, Position, Function, and Hierarchy/Structure of Science
6. Adab and Culture of Science in Muslim Societies: Concepts, Systems, Values and Social History
7. Epistemology, Ontology and Axiology as well as Logic and Language of Science from an Islamic Perspective
8. History of the Growth and Development of Science in Islam: Theological and Historical Studies
9. Ushuluddin and Sharia Sciences: Concept, Scope, Methodology and Role in Life
10. Natural and Health Sciences in Islam: Concept, Scope, Methodology and Role in Life
11. Humanities and Social Sciences in Islam: Concept, Scope, Methodology and Role in Life
12. Islam, Technological Engineering and Social Change: Information Technology, Biotechnology, Cyber War, Climate Change and Social Disruption
13. The Future and Challenges of Science in the Islamic World: Secularism, Liberalism, Colonialism and Taqlidism and Their Impact on Human Civilization
14. Islamization and Integration of Knowledge in Islam: Concept and Implementation in Islamic Higher Education

Recommended Literatures

1. *Al-Quran al-Karim dan Terjemah Tafsiriyah*
2. *Al-Kutub al-Sittah (Shahih al-Bukhari, Shahih Muslim, Sunan al-Tirmidzi, Sunan al-Nasai, dan Sunan Ibn Majah).*
3. Abu Samrah, Mahmùd Ahmad wa al-Barghùtsî 'Imâd Ahmad. 2016. *Al-Islâm wa al-"Ilm*, (al-Quds Palestina: Jami'ah al-Quds).
4. Arif, Syamsuddin. 2008. *Orientalis dan Diabolisme Pemikiran*, Jakarta: Gema Insani Press.
5. Bakar, Osman, 1994. *Tauhid dan Sains*, Bandung: Pustaka Hidayah.
6. Bakhtiar, Amsal. 2004. *Filsafat Ilmu*, Jakarta: PT. Rajagrafindo.
7. al-Fârabî, 1996. *Ihshâ al-'Ulûm,* Beirut: Dar wa Maktabah al-Hilal.
8. al-GhazâlÎ, Abu Hâmid Muhammad bin Muhammad al-Thûsî, 1968. *Ihyâ 'Ulûm al-Dîn,* Beirut: Dar al-Ma'rifah, jilid ke-1.
9. al-Ghazâlî, 2000. *Maqâshid al-Falâsifah*, Dimsyiq: Mathba'ah al-Dhibah

10. Hamâdah, Husain, 1987. *Târikh al-Ulům 'inda al-'Arab,* Beirut: al-Syirkah al-'Alamiyah li al-Kitab.
11. Hamûr, Ahmad Ibrâhîm, 1987. *al-Hadlârah al-Islâmiyah*, Mesir: Dar al-Kutub al-Mishriyah.
12. Hasbu al-Nabî, Manshûr Mahmûd. tth. *Al-Islâm wa al-'Ilm*, Kairo: Dar al-Ma'arif.
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14. al-Halu 'Abduh wa Jâbir, Bahrâd. tth, al-Wâfî fî *Târikh al-'Ulům 'inda al-'Arab,* Dar al-Fikr al-Lubnani.
15. Hoodbhoy, Pervez. 1992. *Islam and Science, Religion Orthodoxy and the Batle for Rationality*, Malaysia: S. Abdul Majeed Co. Edisi berjudul *Indonesia Ikhtiar Menegakkan Rasionalitas Antara Sains dan Ortodoksi Islam,* 1996. Bandung: Mizan.
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23. al-Razi, Fakhruddin, *Mafâtih al-Ghaib*, Beirût: Dâr Ihyâal-Turâts al-'Arabî, 1429 H.
24. Rabî' Muhammad Syahâtah 1998. *Al -Turâts al-Nafsî 'inda 'Ulamâ al-Muslimîn*, (al-Iskandariyah: Dar al-Ma'rifah al-Jami'iyah).
25. Sarwar. H.G. 1994. *Filsafat Al-Quran*, Jakarta:PT RajaGrafindo Persada.
26. Suriasumantri, Jujun S. 1995. *Filsafat Ilmu Sebuah Pengantar Populer*, Jakarta: PT Sinar Harapan.
27. Wan Daud, Wan Mohd Nor, 1998. *The Educational Philosophy and Practice of Syed Muhammad Naquib al-Attas*, diterjemahkan oleh Hamid Fahmy dkk, *Filsafat dan Praktik Pendidikan Islam Syed M. Naquib al-Attas*, Bandung: Mizan.
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29. Al-Yubi, Muhammad Sa'ad ibn Ahmad, 1998. *Maqâshid al-Syarîah al-Islâmiyah*, Riyadl: Dar al-Hijrah li al-Nasyr wa al-Tawzi'.
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31. Zarabuzu, Jamaluddin, *Mâ Huwa al-Islâm*, 1434 H. Arab Saudi: Wizarah li al-Syâun al-Islâmiyah wa al-Awqâf wa al-Da'wah
32. 'Abd al-Mun'im, 1992. Muhammad, *Al-'Adab al-'Arabi fi al-'Ashr al-'Abbasi*, Beirut: Dar al-Jail.
33. Abdul Baqi, Muhammad Fuad, tth. *Al-Mu'jam al-Mufahras li al-Fâzh al-Qur'ân al-al-Karîm,* Bandung: CV Diponegoro, tth.
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35. al-Baidlâwî, Nâshiruddîn Abû Saîd Abdullah bin 'Umar bin Muhammad al-Syairâzî, *Tafsîr al-Baidlâwî*, Beirut: Dar Ihya al-Turats, 1418 H, juz V.
36. al-Fairûz-âbâdî, Majduddin Muhammad bin Ya'qûb, 1993. *Al-Qâmûs al-Muhîth*, Kairo: Dar al-Hadîts.
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41. al-Mawardi, Abû al-Hasan 'Ali bin Muhammad bin Habîb, tth. *Adâb al-Dunyâ wa al-Dîn*, Jeddah: al-Haramain.
42. al-Qaththân, Manna al-Khalîl, 1973. *Mabâhits fi 'Ulûm al-Qur'ân*, Riyâdh: Mansyûrât al-'Ashr al-Hadîts.
43. al-Qaradlawi, Yusuf.1981. *Kaifa Nata'amul ma'a al-Sunnah al-Nbawiyah*, al-Ma'had al-'Ali li al-Fikr al-Islami, 1981.
44. Shaleh, Qomarudin, dkk, 1986. *Asbabun Nuzul*, Bandung: Diponegoro.
45. al-Syarastanî, Muhammad 'Abdul Karim bin Ahmad Abû Bakar Ahmad, *Al-Milal wa al-Nihal,* Beirut: Dar al-Fikr, tth.
46. al-Thahhân, Mahmûd*, Taisîr Musthalah al-Hadîts*, Jeddah: Makthabah al-Haramain, 1985 M.
47. al-Thabari*,* 2000. *Jâmi' al-Bayân fi Ta'wîl Alqurân*, tahkik Ahmad Muhammad Syâkir, tt: Muassah al-Risalah.
48. Yatim, Badri, 1997. *Sejarah Peradaban Islam*, Jakarta: RajaGrafindo Persada.

FST6095118 Molecular Biology

Module Name	Molecular Biology
Module level, if applicable	Basic
Module Identification Code	FST6095118
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si., Drh. RR Bhintarti, M.Biomed
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h • Presentation and discussion: 6 h • Structured activities: 3 h x 14 wks = 42 h • Independent study: 3 h x 14 wks = 42 h • Exam: lecture 2 h x 2 times = 4 h; • Total = 129 hours
Credit points	3 Credit Hours (2-3) ≈ 3.99 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to master the concepts of Molecular Biology, the processes that occur in changes in genetic material in living things, technological processes using living things, the benefits of molecular biology in human life and able to conduct research related to molecular biology.

Module content

1. Lecture contract, History and development of molecular biology and genetic chemistry (DNA)
2. DNA replication
3. DNA transcription
4. DNA translation
5. Changes in genetic material
6. Molecular identification methods
7. Gene Expression
8. Plasmids, Restriction Enzymes and Extrachromosomal Genetic Material
9. Recombination Basics
10. Introduction to Cloning, TRLP and DGGE processes
11. Introduction to Fingerprint, DNA Barcoding, NGS, metagenomics
12. Molecular Biology Applications

Recommended Literatures

1. Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., Watson, J.D., 1989, Molecular Biology of The Cell, 2nd ed., Garland Publishing, Inc., New York
2. Darnell, J., Lodish, H., Baltimore, D., 1990, Molecular Cell Biology,Scientific American Books, New York.
3. Yuwono, T., 2006, Biologi Molekuler, Penerbit Erlangga, Jakarta.

FST6095119 Practicum Molecular Biology

Module Name	Practicum Molecular Biology
Module level, if applicable	Basic
Module Identification Code	FST6095119
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si., Drh. RR Bhintarti, M.Biomed

Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to master the principles and techniques used in the field of molecular biology

Module content

1. Lecture contract & introduction to laboratory K3 principles in molecular biology practicum
2. Introduction to molecular biology analysis tools
3. Preparation of materials for molecular biology analysis
4. Isolation of bacterial chromosomal DNA
5. Isolation of plant DNA
6. Isolation of fungal DNA
7. Isolation of leukocyte DNA
8. Quantitative DNA test
9. Qualitative DNA testing
10. Preparation for DNA amplification via PCR
11. DNA amplification via PCR and visualization of PCR result DNA
12. Protein isolation
13. Quantitative test/protein content
14. SDS-PAGE Electrophoresis

Recommended Literatures

1. Suryohastari, B., & Rahmah, F. A. (2014). Penuntun praktikum biologi molekuler. Jakarta: Program Studi Biologi Fakultas Sains dan Teknologi Universitas Islam Negeri Syarif Hidayatullah
2. Albert, B., Johnson, J., Lewis, M., Raff, K., Roberts., & Walter, P. (2002). *Molecular biology if the cell, 4th Edition*. USA: Garland Science.
3. Amani, J., Kazemi, R., RezaAbbasi, A., & Salmanian, A. H. (2011). A simple and

rapid leaf genomic DNA extraction method for polymerase chain reaction analysis. *Iranian Journal of Biotechnology*, *9*(1). http://ijbiotech.com/14545.pdf (18 Oktober 2014)
4. Fatchiyah, E. L., Arumingtyas, S., Widyarti., & Rahayu, S. (2011). *Biologi molekuler prinsip dasar analisis*. Jakarta: Penerbit Erlangga.
5. Miller, S. A., Dykes, D. D., & Polesky, H. F. (1988). A simple salting out procedure for extracting DNA from human nucleated cells. *Nucleic Acids Research, 16*(3). http://www/ncbi.nlm.nih.gov.pmc.articles.pmc334765/ (21 Oktober 2014)
6. Sambrook, J., Fritschi, E. F., & Maniatis, T. (1989). *Molecular cloning: a laboratory manual*. New York: Cold Spring Harbor Laboratory Press.
7. Yuwono, T. (2005). *Biologi molekuler*. Jakarta: Penerbit Erlangga

FST6095120 Natural Resource and Management

Module Name	Natural resource management
Module level, if applicable	Basic
Module Identification Code	FST6095120
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud., Etyn Yunita, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None

Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to analyze environmental problems.

Module content

1. Natural resources concept
2. Global environmental problems
3. Management of marine and coastal resources
4. Forest management
5. Air and water management
6. Energy management
7. Mineral management
8. Population
9. Sustainable development (SDGs)
10. Introduction to AMDAL
11. Discuss the research results

Recommended Literatures

- Karden E.S. Malik. 2007. Pengelolaan lingkungan hidup
- Suryani. 1990. Kependudukan, Ekologi & lingkungan
- Nybakken, J. W. 1992. Bilologi Laut Suatu Pendekatan Ekologis. P.T. Gramedia PustakaUtama. Jakarta.
- Dahuri R, Rais J, Ginting SP dan Sitepu M.J. 2001. Pengelolaan Sumberdaya Pesisir dan LautanSecaraTerpadu. PT. Pradnya Paramita. Jakarta.
- Effendi, H. 2003. Telaah kualitas air: bagi pengelolaan sumber daya dan lingkungan periaran.Kanisius: Yogyakarta.
- Fardiaz, S. 1992. Polusi air dan udara. Kerjasama Antar Universitas Pangan dan Gizi. InstitutPertanian Bogor. Kanisius: Yogyakarta
- Sutarno. 2013. Sumberdaya Energi. Graha Ilmu, Yogyakarta.
- Kebijakan Mineral dan Batubara Indonesia. 2021. Direktorat Jenderal Mineral dan Batubara, Kementerian Enegi dan Sumberdaya Mineral RI.
- Suratmo,F.G. (2004).Analisis mengenai Dampak Lingkungan,cetakan kesepuluh (revisi),Yogyakarta:Gajah Mada University Press.
- Otto Soemarwoto, 1987. Analisis Mengenai Dampak Lingkungan, PPSDAL, Lembaga Penelitian Universitas Pajajaran, Bandung.
- Kepmen dan Permen tentang Lingkungan Hidup
- International research journals and e-books published less than the last 10 years.
- Articles published in mass media

FST6095121 Principles of Biotechnology

Module Name	Principles of Biotechnology
Module level, if applicable	Basic
Module Identification Code	FST6095121
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si, Dr. Megga Ratnasari Pikoli, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2.755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, ● Students are able mastering the concept of Biotechnology ● Students have the competence to explain the meaning of biotechnology, and the benefits of its application in various fields of life ● Students are able to explain technological processes with the help of the role of mycorrhizae ● Students are able to conduct research related to biotechnology	

Module content
1. SCOPE & DEVELOPMENT OF BIOTECHNOLOGY 2. Conventional biotechnology and modern biotechnology 3. Fermentation biotechnology; principles of microbial cultivation, bioreactor design, and media design. 4. Genetic engineering (recombinant DNA technology), 5. Microbial biotechnology 6. Plant Biotechnology 7. Environmental Biotechnology 8. Bioenergy 9. Gene therapy 10. Monoclonal antibodies 11. Stem cells
Recommended Literatures 1. Primrose, S.B. (1987). Modern Biotechnology. London: Blackwell Scientific Publications. 2. Thieman, William.J., and 2. Palladino, Michael, A. (2013). Introduction to Biotechnology. 3rd edition. Boston: Pearson. 3. Higgins, I.J. (1985). Biotechnology Principles and Applications. London: Blackwell Scientific Publications 4. William J. Thieman, Benjamin Cummings; US Ed edition. Introduction to Biotechnology. 2003 5. Steve Prentis, Bioteknologi, Penerbit Erlangga, 1990 6. Biochemistry, Geoffrey Zubay, 3rd Ed., Wm. C. Brown Publisher, 1993 7. Bacterial Metabolism, Gerhard Gottschalk, Springer-Verlag, 1978

FST6096150 Environmental Chemistry

Module Name	Environmental Chemistry
Module level, if applicable	Basic
Module Identification Code	FST6096150
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Etyn Yunita, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to

	work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; Total = 82,66 h 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2.755ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

1. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including environmental pollution problems
2. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including Waste Problems
3. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including Water Pollution
4. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including Soil Pollution
5. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including Air Pollution
6. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including environmental toxicology
7. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise management of natural resources including Food and Drug Pollution

8. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise management of natural resources including pollution by industry 9. After attending this lecture, students are expected to be able to understand environmental problems scientifically, understand how to manage pollution and be able to design wise natural resource management including biogeochemical cycles
Module content
1. Pollution Problems 2. Water Pollution 3. Soil Pollution 4. Air Pollution 5. Environmental toxicology 6. Food and Drug Pollution 7. Pollution By industry 8. Biogeochemical cycles
Recommended Literatures 1. Ahmad Rukesih, Environmental Chemistry 2. Hefni Effendi, Chemistry of the aquatic environment. 3. Wardhana, W.A. 2004. Impact of Environmental Pollution. Andi. Yogyakarta. 4. Mahida, UN. 1986. Water pollution. Hawk. Jakarta. 5. Connel & Miller. 1995. Chemical Ecotoxicology of Pollution. UI Press. Jakarta. 6. Soemirat, Y. 2003. Environmental toxicology. UGM. Yogyakarta. 7. Darmono. 1995. Metals in the Biological Systems of Living Things. UI. Jakarta. 8. Soemarwoto O. 1988. Environmental Impact Analysis. UGM Press Yogyakarta 9. Sastrawijaya. 1991. Environmental Pollution. Rineka Cipta. Jakarta. 10.National &; international journals

FST6096151 Practicum Environmental Chemistry

Module Name	Practicum Environmental Chemistry
Module level, if applicable	Basic
Module Identification Code	FST6096151
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Etyn Yunita, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	Practicum, class discussion, structured activities (homework, quizzes).
Workload	Lecture (practicum): (1 x 150 min) x 14 wks = 35 h

	Structured activities: 150min x 14wks = 35h Exam: 2 h x 2 times = 4 h Total = 74 hours
Credit points	1 Credit Hours ≈ 2,47 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After this course, students will have the ability to apply fundamental concepts of environmental chemistry in environmental chemistry laboratory experiments	
Module content	
1. Introduction 2. Module 1: Introduction to Sampling Equipment and Air 3. Module 2: Water Sampling and In-Situ Parameter Measurement 4. Module 3: Ammonia (N-NH3) Analysis in Water Using the Phenate Method 5. Module 4: Sulfate (SO4)2- Analysis in Water by Spectrophotometry 6. Module 5: Lead and Cadmium Analysis in Water Using AAS (Atomic Absorption Spectrophotometer) 7. Module 6: Air Sampling and Noise Measurement 8. Module 7: Particulate Dust Measurement Using Gravimetric Methods 9. Module 8: Ammonia Air Measurement 10. Module 9: Nitrite Air Measurement 11. Module 10: SO2 Air Measurement	
Recommended Literatures Environmental Chemistry Laboratory Module	

UIN6000208 Research methodology

Module Name	Research methodology
Module level, if applicable	Basic
Module Identification Code	UIN6000208
Semester(s) in which the module is taught	5

Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (3 x 50 min) x 14 wks = 35 h • Presentation and discussion: 6 h • Structured activities: 3 h x 14 wks = 42 h • Independent study: 3 h x 14 wks = 42 h • Exam: lecture 2 h x 2 times = 4 h; • Total = 129 hours
Credit points	3 Credit Hours (2-3) ≈ 3.99 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to master the concept of scientific research and master how to conduct scientific research and be able to plan and write research proposals with the right scientific research format that is appropriate and correct	
Module content	
1. Basic concepts of scientific research 2. Problems, variables and research methods 3. Framework of thinking 4. Hypothesis 5. Research design 6. Sampling technique 7. Data collection technique 8. Data analysis technique	

9. Bibliography writing techniques 10. Techniques for making research proposals 11. Journal article writing techniques 12. Proposal presentation 13. Proposal presentation 14. Proposal presentation
Recommended Literatures 1. Lily Surayya Eka Putri. 2008. Metodologi Penelitian untuk Bidang Sains. Lembaga Penelitian UIN Syarif Hidayatullah Jakarta.UNEP. 2005. Solid waste management. Ca Recovery. Inc. 2. Cholid Narbuko dan Abu Ahmadi. 2007. Metodologi Penelitian. Penerbit Bumi Aksara. 3. Sugiyono. 2011. Metode Penelitian Pendidikan Pendekatan Kuantitatif Kualitatif dan R&D. Alfabeta. Jakarta.Kepmen dan Permen tentang Limbah dan Lingkungan Hidup 4. Writing guidelines in the Al-Kauniyah Journal 5. Guidelines for writing a thesis for Biology Study Program, FST, UIN Jakarta 6. International research journals and e-books published less than the last 10 years. 7. Articles published in mass media

FST6095122 Evolution

Module Name	Evolution
Module level, if applicable	Basic
Module Identification Code	FST6095122
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si., Dr. Priyanti, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h

	• Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students can illustrate the process of animal and plant evolution	
Module content	
1. Facts supporting the theory of pre- and post-Darwinist evolution 2. Mendel's Laws, Huge De Fries and Hardy Weinberg's Laws and Their Deviations 3. Phylogeny and Evolution of the genome, Favored race 4. Adaptation, selection, physical and reproductive isolation mechanisms 5. Gene pool, genetic drift and founder effect and bottle neck mechanism 6. Earth's evolutionary history 7. Verses from the Koran relating to the evolution of the earth and their interpretations 8. History of human evolution based on fossil findings 9. Evolution of human culture 10. The theory of evolution according to Islamic scientists 11. Current debates in evolutionary theory 12. History of paleobotany 13. Evolution of aquatic plants and evolution of land plants 14. Evolution of vascular and nonvascular plants	
Recommended Literatures 1. Iskandar, T. 2016. Evolusi. Universitas Terbuka 2. Maynard, J. S. 2011. The theory of Evolution. Cambridge University Press. 3. Articles relevant to the development of evolutionary theory	

FST6095123 Introduction to Bioinformatics

Module Name	Introduction to Bioinformatics

Module level, if applicable	Basic
Module Identification Code	FST6095123
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Nani Radiastuti, Dr. Megga Ratnasari Pikoli, M.Si.
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with laptop and PowerPoint presentation, database DNA and protein
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
ahasiswa memiliki pemahaman tentang perangkat lunak yang umum digunakan dalam bioinformatika After completing this course, students have an understanding of commonly used software in bioinformatics	
Module content	
1. Introduction (background to bioinformatics) 2. DNA and protein sequence database 3. Data format 4. Data submission and retrieval	

5. Electropherogram analysis 6. BLAST (Basic Local Alignment Search Tool) 7. Multiple sequence alignment 8. Phylogenetic tree reconstruction 9. Data interpretation of phylogenetic tree 10. Primer design 11. Genome annotation 12. Protein structure modeling 13. Discussion of mini project result 14. Discussion of mini project result
Recommended Literatures 1. Choudhuri, S. (2014). Bioinformatics for beginners: genes, genomes, molecular evolution, databases and analytical tools. Elsevier. 2. Sofi, M. Y., Shafi, A., & Masoodi, K. Z. (2021). Bioinformatics for everyone. Academic Press. 3. NCBI, DDBJ, EMBL 4. Free tools (MEGAX, UGENE, ExPASy, dll)

FST6095134 Scientific Communication Techniques

Module Name	Scientific Communication Techniques
Module level, if applicable	Basic
Module Identification Code	FST6095134
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si., Dr. Dasumiati, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h

	• 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation, video
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to express the results of their research and thoughts in the form of scientific papers, and present them according to the correct rules.	
Module content	
1. General description of scientific research and reporting 2. Types and characteristics of scientific papers 3. Techniques for writing scientific papers 4. Language of science: terms and definitions 5. Scientific language: effective sentences 6. Scientific language: paragraphs 7. Abstract and introduction 8. Results and discussion 9. Tables, figures and diagrams 10. Citation and referencing techniques 11. Common writing errors 12. Ethics in publication 13. Techniques for creating presentation media 14. Presentation techniques	
Recommended Literatures 1. Trim, B. (2017). 200+ solusi Editing Naskah dan Penerbitan. Bumi Aksara 2. Pedoman Penulisan Skripsi 2019 (http://bio.fst.uinjkt.ac.id) 3. Mendeley Desktop (https://www.mendeley.com/download-desktop/) 4. Smallseotools (https://smallseotools.com/plagiarism-checker/) 5. Elsevier (https://www.elsevier.com/authors/journal-authors/policies-and-ethics)	

FST6095125 Bioethics

Module Name	Bioethics
Module level, if applicable	Applied
Module Identification Code	FST 6095125
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si.
Language	Indonesian
Relation in Curriculum	Compolsory course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
• Able to explain the history of the development of bioethics and why it needs to be studied • Able to explain and find solutions to value conflicts related to technology • Able to work together in international ethical terms, both in the academic environment and in everyday life	
Module content	
• Understanding Bioethics and Applications in Life • History of the Development of Bioethics and Ethical Clearance • Basic Principles in Bioethics • Bioethical Issues in the Medical World (1) • Bioethical Issues in the Medical World (2) • Basic Principles of Bioethics in the Use of Experimental Animals • Basic Principles of Bioethics for Research on Human Subjects • Basic Principles of Boethics in Research on Humans as Objects • Bioethics in Plants and Natural Resources • Basic Principles of Bioethics in Writing and Publicating Scientific Work • Basic Principles of Bioethics in the Use of Stored Biological Materials (BBT) • Bioethics in Epidemiological and Sociocultural Research • Explanation After Approval (PSP) / Informed Consent	

● Health Research Ethics Committee
Recommended Literatures ● Reich, W.T. Encyclopedia of Biotethics vol 1. Revised Ed. 1995. Simon & Schuster Macmillian, Prentice Hall International. (Pustaka Utama) ● Bernard G., Charles M. C., Danner C. 2006. Bioethics: A Systematic Approach. ● Nuffield Council on Bioethics. 1993. Genetic Screening. Ethical Issues. (Pustaka Pendukung) National Academy of Science. 1995. On being a Scientist. Responsible Conduct in Research. Washingtpon D.C. National Academy Press. ● Beauchamp, T. and J.F. Childress. 2001. Principles Biomedical Ethics, OUP, 5th edition. (Pustaka Utama) ● M. Jusuf Hanafiah Amri Amir. 2007. Etika kedokteran dan hukum kesehatan ed 4. ● Sastrawinata, S. B.A. Sidharta, M.R. Maengkom. 1998. Tata Laksana Komite Etik, Pedoman Etik dan Penjelasan Pedoman Etik Rumah Sakit. Rumah Sakit Santo Borromeus.

FST6092035 Technopreneurship

Module Name	Technopreneurship
Module level, if applicable	Applied
Module Identification Code	FST 6092035
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Nur Inayah, M. Si / Dr.Taufik Edy Sutanto, MSc.Tech
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into five groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	Lecture (class): (2 x 50 min) x 14 wks = 23,33 h Structured activities: 2 h x 14 wks = 28 h Independent study: 2 h x 14 wks = 28 h Exam:2 x 50 min x 2 times (mid test and final test) = 3.33 h; Total = 82,66 h
Credit points	82,66 / 30 = 2.755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 75% attendance in lecture
Recommended prerequisites	-
Media employed	Classical teaching tools with white board and Power Point presentation

Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing the course, the Students will have the ability to develop an entrepreneurial spirit and analyze entrepreneurial activities.

Module content

Lecture (Class Work)

1 Technopreneurship and Inspiration
2 Motivation and Technopreneurship Opportunities
3 Technopreneurship Organizational Governance
4 Technopreneurship Ownership
5 Ethical Considerations in Technopreneurship
6 Technopreneurship Intelligence
7 Capital and Financial Management
8 Product Design
9 Forms of Marketing
10 Environmental Analysis
11 Competitor Analysis
12 Monitoring and Evaluation
13 Technopreneurship Revolution
14 Business Plan

Recommended Literatures

1. Inayah, Nur, Achmad Tjachja, and Moh. Irvan, 2021, *Introduction to Entrepreneurship, Andi Publisher*, Yogyakarta.
2. Rusman Hakim, *Success Tips for Entrepreneurship*, Gramedia, Jakarta, 2009.
3. Masykur Wiratno, *Introduction to Entrepreneurship: Basic Framework for Entering the Business World*, BPFE, Yogyakarta, 2010.
4. Peter F. Drucker, *Innovation and Entrepreneurship: Practice and Fundamentals*, Gelora Aksara Pratama, 2012.
5. H. Fatkul Muin, *Let's Be Entrepreneurs*, 2014.
6. Darmanto, *Entrepreneurship*, 2017.
7. Edy Dwi Kurniati, *Industrial Entrepreneurship*, 2017.
8. Dyanasari and Asnah, *Small Business Management and Entrepreneurship*, 2018.
9. Ika Sari Dewi, S.S., M.Si., and I.K. Sihombing, M.Si., *Entrepreneurship and Strategic Management of Rural SMEs*, 2019.
10. Muh. Saleh Malawat, *Entrepreneurship in Education*, 2019.
11. Nathanael Sitanggang and Putri Lynna A. Luthan, *Entrepreneurship Management in the Furniture Industry*, 2019.
12. Rachmat Hidayat, SKM., M.Kes, *Cultivating Entrepreneurial Spirit*, 2019.
13. Prof. Dr. H. Saban Fchdar, S.E., M.Si, Dr. Maryadi, S.E., M.M, *Business Ethics and Entrepreneurship*, 2019.

III. COMPLEMENTARY COMPETENCIES

FST6095202 Ornithology

Module Name	Ornithology
Module level, if applicable	Basic
Module Identification Code	FST6095202
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Walid Rumblat, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students have knowledge of theoretical concepts in ornithology	
Module content	
1. Origin and Evolutionary History 2. Body characteristics and functions of birds 3. Behaviour and Environment 4. Behaviour and Communication 5. Population Dynamics and Conservation 6. Birds and people 7. Introduction to waterbirds	

8. Bird surveying and photography techniques
Recommended Literatures 1. Wallace GJ dan Mahan HD. an Introduction to Ornithology. 1975. MacMillan Publishing. New York. 2. Gill FB. Ornithology 3rd edition. 2007. WH Freeman and Company. New York 3. Peterson RT. 1980. Burung. Tira Pustaka. Jakarta 4. Tirtaningtyas FN dan Febrianto I. 2013. Burung pantai: panduan lapangan di pantai cemara, Jambi. Wildlife Indonesia Society-Indonesia Programe. Bogor. 5. Bibby CJ, Burgess ND, Hill DA. 1992. Bird census techniques. London. Academic Press.

FST6095204 Bacteriology

Module Name	Bacteriology
Module level, if applicable	Basic
Module Identification Code	FST6095204
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si., Arina Findo, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation

Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain biological concepts supported by other relevant sciences to understand developing problems, issues and their applications. Students are able to use standard methodologies to solve problems related to biology and their implementation. Students are able to demonstrate the results of conceptual, analytical, logistical and innovative thinking in oral and written form. Students are able to participate actively in the development of science and technology throughout their lives.	
Module content	
9. Introduction (background history and general properties of bacteria) 10. External structure of bacteria 11. Internal structure of bacteria 12. Isolation and cultivation of bacteria 13. Identification of bacteria by cultivation-dependent method 14. Identification of bacteria by cultivation-independent method 15. Classification of bacteria 16. Bacterial environment 17. Groups of bacteria in nature 18. Groups of pathogenic bacteria in human	
Recommended Literatures 1. Madigan, M. T., Bender, K. S., Buckley, D. H., Sattley, W. M., Stahl, D. (2022). Brock Biology of Microorganisms 16th edition. Global Edition. Pearson Education Limited. 2. Rosenberg, E., DeLong, E. F., Lory, S., Stackebrandt, E., & Thompson, F. (Eds.). (2014). The prokaryotes: other major lineages of Bacteria and the Archaea. Springer. 3. Goodfellow, M. and A.G. O'Donell (Editors). 1994. Handbook of New Bacterial Systematics. Academic Press, London. 4. Holt, J.G. et al (Eds). 1994. Bergeys Manual of Determinative Bacteriology. Ninth Edition. Williams & Wilkins, Baltimore. 5. Singleton, P. 1995. Bacteria in Biology, Biotechnology and Medicine. Third Edition. John Wiley & Sons, New York. 6. International research journals and e-books published less than the last 10 years.	

FST6095205 Phycology

Module Name	Phycology
Module level, if applicable	Basic
Module Identification Code	FST6095205
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si., Ardian Khairiah, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion.

	Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to understand biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to analyze environmental problems.	
Module content	
1. Introduction to algal cell structure 2. Physiology of algae 3. Nutrition of algae 4. Isolation and purification of algae 5. Cultivation and preservation of algae 6. Classification of algae 7. Identification of algae 8. Cyanobacteria and Glaucophyta 9. Rhodophyta 10. Chlorophyta 11. Euglenophyta 12. Dinophyta 13. Another group of algae 14. Algal environment	
Recommended Literatures 1. Lee, R. E. (2018). Phycology. Cambridge University Press. 2. Baweja, P., & Sahoo, D. (2015). Classification of algae. In The algae world. Springer, Dordrecht.	

3. Ynalvez, R. A., Dinamarca, J., & Moroney, J. V. (2018). Algal Photosynthesis. eLS, 1-9.
4. Bellinger, E. G., & Sigee, D. C. (2015). Freshwater algae: identification, enumeration and use as bioindicators. John Wiley & Sons.
5. Kunci identifikasi berbasis web https://fmp.conncoll.edu/Silicasecchidisk/CarolinaKey_Information.html
6. International research journals and e-books published less than the last 10 years.

FST6095207 Terrestrial Ecology

Module Name	Terrestrial Ecology
Module level, if applicable	Basic
Module Identification Code	FST6095207
Semester(s) in which the module is taught	4
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2.755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome
1. Students are able to explain the background of ecology and the development of ecological science 2. Students are able to explain the concepts of environmental ecology, plant ecology and animal ecology 3. Students are able to master the thermodynamic principles of ecosystems and their constituent components 4. Students are able to describe methods for measuring and analyzing ecosystems 5. Students are able to analyze ecosystem problems with their expertise in the field of biology to develop their commitment to environmental conservation in an effort to create an independent, honest and tough character. 6. Students are able to communicate the results of ecological research effectively both orally and in writing 7. Able to make decisions based on ecological data as a form of responsibility in carrying out tasks
Module content
1. Basic concepts of ecosystems 2. The process of forming an ecosystem and the distribution of species in the ecosystem 3. Energy in ecosystems 4. Biogeochemical Cycles 5. Law of tolerance and limiting factors 6. Ecosystem types 7. Population and community 8. Inter specific and intra specific interactions 9. Plant ecology 10. Animal Ecology and animal behavior 11. BIOGEOGRAPHY
Recommended Literatures 1. Cox,WG. 2002. General Ecology. Laboratory Manual. Mc.Graww Hill. 2. Odum, E.P. 1971. Fundamental of Ecology. Toppan company Ltd. Tokyo. 3. Krebs JR & Davies NB. 1989. Behavioural ecology.An Evolutionary Approach. Black well scientific publications. 4. Setiadi,Dede. Puspo Dewi.T. 1989. Dasar dasar Ekologi. IPB.Bogor. 5. Soerianegara,I. Dan Andry Indrawan. Ekologi Hutan Indonesia. IPB.Bogor. 6. Wirakusumah,Sambas. 2003. Dasar Dasar Ekologi. UI.Jakarta.

FST6095208 Urban Entomology

Module Name	Urban entomology
Module level, if applicable	Basic
Module Identification Code	FST6095208

Semester(s) in which the module is taught	4
Person(s) responsible for the module	Narti Fitriana, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Generalise basic knowledge of entomology that can lead to detailed knowledge at an advanced stage	
Module content	
1. Introduction and introduction to the world of insects 2. Familiarity with insect morphology 3. Body structure and physiology of insects 4. Insect metamorphosis 5. Insect collection techniques	

6. Ecological role of insects 7. Butterfly conservation in urban areas 8. Bioecology of social insects 9. Bioecology of solitary insects 10. Familiarity with insects in housing 11. Getting to know insects in warehouses 12. Insects and phytosanitary 13. Journal presentation 14. Journal presentation
Recommended Literatures ● Campbell et al. 2006. Biology Concept and Connection. Pearson Benjamin Cummings. San Francisco. ● Borror, Triplehorn and Johnson. 2004. Introduction to study the insect.

FST6095209 Plant Tissue Culture

Module Name	Plant Tissue Culture
Module level, if applicable	Basic
Module Identification Code	FST6095209
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Ardian Khairiah, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS

Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to use standard methodologies and software to solve problems related to biology and their implementation. Students are able to work independently and in teams according to their skills. Students are able to interpret research data.

Module content

1. Introduction to plant tissue culture: Understanding and benefits of tissue culture, the science underlying plant tissue culture, the scope of tissue culture studies, the history of the development of tissue culture
2. Basic principles of Tissue Culture: Cell Totipotency, proliferation, cell differentiation & dedifferentiation, embryogenesis and organogenesis, and in vitro cell growth factors
3. Explants in plant tissue culture: leaves, meristems, seeds, anthers, embryo cultures, callus
4. Tissue culture applications on solid media: sterilization, media (P)
5. Tissue culture applications on solid media: explants, planting and maintenance (P
6. Tissue culture applications on solid media: maintenance, observation (P)
7. Haploid culture and protoplast fusion
8. Tissue culture applications on liquid media: sterilization, media (P)
9. Tissue culture applications on liquid media: explants, planting and maintenance (P
10. Tissue culture applications on liquid media: maintenance, observation (P)
11. Acclimatization: Acclimatization techniques and supporting factors (P)
12. In vitro selection and somaclonal variation
13. Micropropagation: horticultures, woody plants, flowers, tubers
14. Meristem culture (virus-free culture)

Recommended Literatures

1. Doyle, A and J. Bryan. 1988, Cell and Tissue Culture, Laboratory Procedures in Biotechnology, John Wiley and Son, Toronto.
2. Hartman HT, D.E. Kester, F.T. Davies Jr and R.L. Geneve, 2002, Plant Propagation, Principles and Practices, seventh edition, Pearson Education,Inc.
3. Smith , R.H., 2000, Plant Tissue Culture, Academic Press, San Diego, USA.Pierik.
4. International research journals and e-books published less than the last 10 years.

FST6095210 Aquatic Ecology

Module Name	Aquatic Ecology
Module level, if applicable	Basic
Module Identification Code	FST6095210
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Agus Salim, S.Ag,M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	

Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to analyze environmental problems.

Module content

1. The term ecology, levels of organization of life,
2. Division of ecology, relationship of ecology with other sciences, and aquatic ecology
3. Aquatic ecosystem.
4. Stagnant water ecosystems include introduction, objectives, benefits, determining stations
5. Determination of physical, chemical, biological parameters.
6. Flowing water ecosystem.
7. brackish water ecosystem,
8. Mangrove ecosystem.
9. Marine ecosystems consisting of seagrass ecosystems, seagrass zoning.
10. Identify seagrass.
11. Determination of water quality parameters (physical parameters) of mangrove ecosystems
12. Determination of water quality parameters (chemical parameters) of mangrove ecosystems
13. Determination of water quality parameters (biological parameters) of mangrove ecosystems
14. Field trips

Recommended Literatures

1. Bengen, Dietriech G. 2001. Sinopsis ekosistem dan sumber daya pesisir dan laut. Pusat Kajian Sumber Daya Pesisir dan Lautan.
2. Bengen DG. 2009. Perspektif ekosistem pesisir dan laut dalam karakteristik dan dinamikanya. Tidak dipublikasikan. Bahan Kuliah Mayor Ilmu Kelautan, FPIK, IPB. Bogor.
3. Dahuri R, Rais J, Ginting SP dan Sitepu M.J. 2001. Pengelolaan Sumberdaya Pesisir dan Lautan Secara Terpadu. PT. Pradnya Paramita. Jakarta.
4. Effendi, H. 2003. Telaah kualitas air: bagi pengelolaan sumber daya dan lingkungan periaran. Kanisius: Yogyakarta.
5. Ewusse, S.Y. 1990. Ekologi Tropik, Terjemahan Usman Tanuwijaya. ITB. Bandung
6. Gonawi, G.R. 2009. Struktur Komunitas Nekton Di Sungai Cihideung, Bogor, Jawa Barat. [skripsi]. Departemen Manajemen Sumberdaya Perairan. FPIK IPB
7. Fardiaz, S. 1992. Polusi air dan udara. Kerjasama Antar Universitas Pangan dan Gizi. Institut Pertanian Bogor. Kanisius: Yogyakarta
8. Harteman, Edison. 1998. Afinitas Komunitas Ikan dengan Habitat di Sungai Kapuas, Kabupaten Kapuas, Kalimantan Tengah. [Tesis]. Fakultas Pasca Sarjana. Institut Pertanian Bogor. Bogor (tidak dipublikasikan).
9. Nurcahyadi, Wahyu. 2000. Keanekaragaman Sumberdaya Hayati Ikan di Daerah Aliran Sungai (DAS) Cikiniki dan Cisukawayana, Taman Nasional Gunung Halimun, Jawa Barat. [Skripsi]. Progaram Studi Manajemen Sumberdaya Perairan. FPIK. IPB. Bogor (tidak di publikasikan).
10. Nybakken, J. W. 1992. Bilologi Laut Suatu Pendekatan Ekologis. P.T. Gramedia Pustaka Utama. Jakarta.

11. Rangkuti, Ahmad M. 2009. Studi Kandungan Logam Berat Hg, Pb, dan Cd pada Air dan Sedimen di Perairan Pulau Panggang-Pramuka Kep. Seribu DKI Jakarta. [skiripsi]. Departemen Manajemen Sumberdaya Perairan, FPIK IPB
12. Wijaya, K.H. 2009. Komunitas Perifiton Dan Fitoplankton Serta Parameter Fisika-Kimia Perairan Sebagai Penentu Kualitas Air Di Bagian Hulu Sungai Cisadane, Jawa Barat. [skripsi]. Departemen Manajemen Sumberdaya Perairan, FPIK IPB
13. International research journals and e-books published less than the last 10 years.
14. Articles published in mass media

FST6095211 Mycology

Module Name	Mycology
Module level, if applicable	Basic
Module Identification Code	FST6095211
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si., Reno Fitri, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to apply knowledge about fungi in everyday life to society, industry and the environment. Students are able to recognize the diversity of macro and micro fungi Students are able to carry out research related to fungi

Module content

1. Lecture contract, Concept of the position of fungi in the plant world
2. Fungal growth and metabolism
3. Reproduction of fungi 1
4. Reproduction of fungi 2
5. Macroscopic, microscopic characteristics, reproductive organs and the diversity of Oomycetes, Zymycetes
6. Macroscopic, microscopic characteristics, diversity and reproductive organs of Ascomycetes
7. Macroscopic, microscopic characteristics, reproductive organs, and diversity Basidiomycetes
8. How to identify fungi
9. Fungi and deterioration
10. The role of fungi in food and industry
11. The role of fungi in health and the environment
12. Mushroom cultivation
13. Discussion of mini project reports
14. Discussion of mini project reports
15. Discussion of mini project reports

Recommended Literatures

1. Alexopoulus, J.C. dan Mims, C.W. 1907. Introductory Mycology. John Willey & Sons New York
2. Barnett, H. L., & Hunter, B. B. (1998). Illustrated Genera of Imperfect Fungi 4th Edition. 218
3. Cappuccino, J. G., & Sherman, N. (2005). Microbiology: a laboratory manual
4. Watkinson, S. C., Boddy, L., & Money, N. (2015). The fungi. Academic Press.
5. Darnetty, 2006. Pengantar Mikologi. Andalas University Press. Padang
6. Dwidjoseputro. 1978. Pengantar Mikologi. Penerbit Alumni. Bandung
7. Gandjar, I, R.A. Samson, K van den Tweel-Vermeulen, A. Oetari dan I Santoso. 1999. Pengenalan Kapang Tropik Umum. Yayasan Obor Indonesia. Jakarta

8. Gandjar, I., A. Oetari,dan W. Sjamsuridzal.. 2006. Mikologi Dasar dan Penerapan. Yayasan Obor Indonesia. Jakarta
9. Achmad (2013). Panduan Lengkap Jamur. Depok: Penebar Swadaya.

FST6095212 Ethology

Module Name	Ethology
Module level, if applicable	Basic
Module Identification Code	FST6095212
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None

Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students can understand the theories and concepts of animal behavior, understand how to observe animal behavior, analyze animal behavior, conduct animal behavior research and identify potential values obtained from animal behavior.	
Module content	
1. Animal behavior and human behavior 2. Elements of behavior: ways of studying 3. Different capacities: anatomy and behavior 4. Internal causes: the physiology of behavior 5. Learning: the influence of experience 6. Heredity and behavior 7. Intelligence: the organization of behavior 8. Social behavior and social organization 9. Communication: Animal language 10. Behavior and environment 11. Behavior and evolution	
Recommended Literatures 1. John Paul Scott. 1972. *Animal behavior.* The University of Chicago Press. Chicago 2. Niko Tinbergen. 1979. *Perilaku binatang.* Pustaka Alam Life. Jakarta 3. Paolo Casale. *Animal behavior: instinct, learning, cooperation.* 4. Barnard, Chris. 2004. *Animal Behavior; Mechanism, Development, Function and Evolution.* England: Pearson Prentice Hall.	

FST6095213 Secondary Metabolism

Module Name	Secondary Metabolism
Module level, if applicable	Basic
Module Identification Code	FST6095213
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Drs, Dede Sukandar, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After attending this lecture students are expected to: 1. Able to apply the process of isolation and identification of secondary metabolic compounds 2. Able to analyse the classification, structural variation, tatanama, biosynthesis and synthesis of terpenoids. 3. Able to analyse the classification, structure, stereochemistry and activity of steroids 4. Able to analyse the classification and origin of phenylpropanoids 5. Able to synthesise the structure, biosynthesis, properties and synthesis of polyketides 6. Able to analyse the classification, structure, interconversion and synthesis of flavonid 7. Able to analyse the classification, structure, rearrangement and synthesis of alkaloids 8. Able to synthesise useful natural material compounds 9. Able to apply metabolomics and biotransformation approaches	

Module content
1. Isolation and identification of secondary metabolic compounds 2. Classification and biosynthesis of terpenoids 3. Structure and stereochemistry of terpenoids 4. 4. Cyclisation and Wagner-Meerwein Rearrangement 5. Structure and Properties of Steroids 6. Structure and Activity of Steroids 7. Classification and Origin of Phenylpropanoids 8. Structure and Biosynthesis of Polyketides 9. Properties and Synthesis of Phenylpropanoids and Polyketides 10. Classification and Structure of Flavonids 11. Interconversion and Synthesis of Flavonoids 12. Classification and Structure of Alkaloids 13. Alkaloid Rearrangement and Synthesis 14. Useful Natural Material Compounds 15. Metabolomics and biotrasformation approaches of secondary metabolism
Recommended Literatures 1. Achmad, Sjamsul Arifin, 1986, Kimia Organik Bahan Alam, Karunika, Jakarta. 2. Nakanishi, Koji, et.all, 1983, Natural Products Chemistry - Vol. 1,2,3, University Science Books, California. 3. Sarker SD, Latif Z and Gray AI. Natural Product Isolation. 2006. 2nd Edition. Humana Press Inc. Totowa 4. Parijadi RAA, Putri SP. 2017. Aplikasi Pendekatan Metabolomik untuk Tanaman. ITB. Bandung 5. Doble Mukesh. Kruthiventi Kumar Anil and Ganjanan Vila. 2004. Biotranforation and Bioprocesses. 1st Edition. CRC Press. Boca Raton.

FST6095214 Mammalogy

Module Name	Mammalogy
Module level, if applicable	Basic
Module Identification Code	FST6095214
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant

	examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
1. Students are able to explain the definition of mammology, scope, history and its relationship to other fields of science. 2. Students are able to identify types of mammals in Java 3. Students are able to identify types of mammal groups 4. Students get to know the various types of natural habitats of mammals. 5. Students are able to analyze mammal ecology problems with their expertise in the field of biology to develop their commitment to mammal conservation in an effort to create an independent, honest and tough character. 6. Students are able to communicate the results of mammal ecology research effectively both orally and in writing 7. Able to make decisions based on mammal ecological data as a form of responsibility in carrying out tasks	
Module content	
1. Introduction to Mammology 2. Classification and Distribution of Mammals 3. Evolution and Biogeography of Mammals 4. Mammalian Morphology and Movement Systems 5. Reproduction and Growth	

6. Mammal Social Groups 7. Habitats 8. Communication and Spatial Relationships of Mammals 9. Social Behavior 10. Feeding Ecology 11. Reproductive Strategy 12. Mammal Community 13. Mammal Research Methods 14. Mammal Conservation
Recommended Literatures 1. Feldhamer, GA., Drickamer, LC., Vessey SH., Merritt JF., Krajewski, C. 2015. *Mammalogy: Adaptation, Diversity, Ecologi (Fourth Edition)*. Johns Hopkins University Press. Baltimore. 2. Jones, JK., Anderson, S. 1976. *Readings in Mammalogy*. The University of Kansas Printing Service. Kansas. 3. Mayer, William (Eds.). 1965. *Physiological Mammalogy. Volume 1: Mammalian Population*. Academic Press. New York 4. Mayer, William (Eds.). 1965. *Physiological Mammalogy. Volume 2: Mammalian Reaction to Stressful Environment*. Elsevier Science. Burlington

FST6095215 Palynology

Module Name	Palynology
Module level, if applicable	Basic
Module Identification Code	FST6095215
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Priyanti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h

	• Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to interpret research data. Students are able to demonstrate the results of conceptual, analytical, logical and innovative thinking in oral and written form.

Module content

1. Pollen and spores and their uses
2. Pollen as fossil evidence
3. Morphological characters of pollen: units and shape
4. Aperture class and type
5. Number and position of apertures
6. Pollen size and symmetry
7. Pollen polarity and exine ornamentation
8. Pollen sample collection techniques
9. Pollen preservation preparation method
10. The link between pollen and health
11. Pollen as evidence of plant systematics
12. Pollen and pollinators
13. Paleoecology
14. Pollen diversity of ornamental plants around campus.

Recommended Literatures

1. Agashe, S.N. 2019. Pollen and Spores: Application with special emphasis on Aerobiology and allergy. England, CRC Press.
2. Halbritter, H., Ulrich, S., Grímsson, F., Weber, M., Zetter, R. Hesse, M., Buchner, R., Frosch-Radivo, M.S.A. 2018. Illustrated Pollen Terminology. Springer.

FST6095216 Population Genetics

Module Name	Population Genetics
Module level, if applicable	Basic
Module Identification Code	FST6095216
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Dr. Dasumiati, M.Si.,.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course students are able to analyze genetics and changes in populations based on the concept of population genetics which can be used to write observation reports and other practice-oriented case study research.	
Module content	
1. The concept of population genetics: understanding and scope of population genetics 2. Implications of Mendel's laws of inheritance in populations 3. Hardy-Weinberg law and the concept of gene frequency, genotype in populations 4. Random mating in the population 5. Natural selection 6. Mutation	

7. Migration 8. Inbred 9. Population size is limited 10. Genetic drift and other evolutionary forces 11. Double linked genes 12. Quantitative Character 13. Polygenic characters in natural populations 14. Molecular genetic analysis of populations
Recommended Literatures 1. John H.Gillespie. 1998. Population Genetics. The Johns Hopkins University Press 2. Joseph Felsenstein. 2019. Theoretical Evolutionary Genetics. Department of Genome Sciences and Department of Biology University of Washington 3. International research journals and e-books published less than the last 10 years.

FST6095217 Herpetology

Module Name	Herpetology
Module level, if applicable	Basic
Module Identification Code	FST6095217
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h;

	• Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

1. Students are able to understand the basic principles of herpetology in the scope of taxonomy, ecology and behavior.
2. Students understand the basic technique to assess taxonomy and ecology of herpetofauna
3. Able to solve problems and apply principles and theories of herpetofauna through mini projects

Module content

1. Introduction to herpetology
2. Physiology and ecology
3. Reproduction system
4. Communication and social behavior
5. Behavioral ecology
6. Taxonomy of amphibian class
7. Taxonomy of reptile class
8. Mid-term examination

9-15. Mini project implementation

16. Mini Project Results Presentation

Recommended Literatures

- AmphibiaWeb. (2018). **https://amphibiaweb.org/search/index.html.**
- Iskandar DT. (1998). *Amfibi Jawa dan Bali*. LIPI: Bogor.
- Hickman CP., Roberts LS., Keen SL., Larson A., I'Anson H., Eisenhour DJ. (2008). *Integrated Principles of Zoology*. New York: McGraw-Hill.
- Das I. (2010). *A Field Guide to The Reptiles of South-East Asia*. London: New Holland Publisher.
- Vitt LJ and Caldwell JP. (2009). Herpetology 3rd Edition. Academic Press: UK
- Uetz, P., Freed, P. & Hošek, J. (eds.) (2020) The Reptile Database, http://www.reptile-database.org

• All journals of herpetofauna from Indonesia. Please see them from the herpetologist of Indonesia; Djoko Iskandar, Amir Hamidy, Helen Kurniati, Irvan Sidik, Awal Riyanto, Umilaela Arifin and others.

FST6095218 Ecotourism

Module Name	Ecotourism
Module level, if applicable	Applied
Module Identification Code	FST6095218
Semester(s) in which the module is taught	5
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud.
Language	Indonesian
Relation in Curriculum	Electivecourse for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None

Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to build bio-entrepreneurship skills.	
Module content	
1. History and development of ecotourism 2. Definition, concept and scope of ecotourism 3. The relationship between ecotourism and the socio-cultural aspects of local communities 4. Economic value of ecotourism 5. Ecotourism policy 6. The effect of ecotourism on the environment 7. Prospects and partnerships in ecotourism 8. Development of sustainable ecotourism	
Recommended Literatures ● Fennell, David A. 2003. Ecotourism, Second Edition. London: Routledge. ● Drumm, Andy dan Alan Moore. 2002. An Introduction to Ecotourism Planning. Virginia: The Nature Conservancy. ● Hill, Jennifer and Tim Gale (Ed).2009. Ecotourism and Environmental sustainability Principles and Practice. England: Ashgate Publishing. ● Buckley, Ralf. 2003. Case Studies in Ecotourism. UK: CABI Publishing ● International research journals and e-books published less than the last 10 years. ● Articles published in the mass media	

FST6095219 Food Microbiology

Module Name	Food Microbiology
Module level, if applicable	Applied
Module Identification Code	FST6095219
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Nani Radiastuti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of

	discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation, video
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain the role of microbes in food processing. Students are able to explain the properties of microbes that play a role in food spoilage. Students are able to explain the role of microbes in the food industry. Students are able to trace the food halal from microbiological elements	
Module content	
1. Introduction, classification and characteristics of microbes 2. Microbial growth and ecology 3. Characteristics of microbes that play a role in food spoilage: Bacteria 4. Characteristics of microbes that play a role in food spoilage: Mold and yeast 5. Mechanisms of microbial resistance to processing processes 6. Quantitative microbiological analysis of food ingredients 7. Microbiological indicators of food quality and safety 8. Principles and effects of preservation in food processing on microbes 9. The role of microbial culture in food processing and food halal 10. Microbiological control in the food service industry 11. Genetic engineering in the food industry 12. Types of traditional fermented foods and drinks 13. Presentation of mini project result 14. Presentation of mini project result 15. Presentation of mini project result	
Recommended Literatures 1. Fardiaz, S. 1989. Mikrobiologi Pangan. PAU Pangan dan Gizi. IPB. Bogor.	

2. Frazier, W.C. & D.C. Westhoff, 1988. Food Microbiology. McGraw-Hill, Inc. Toronto.
3. Jay, J.M. 2000. Modern Food Microbiology. Sixth Edition. Aspen Publisher, Inc. Gaithersburg, Maryland
4. Fardiaz, S. 1992. Mikrobiologi Pangan I. Gramedia, Jakarta.
5. Fardiaz, S. 1992. Mikrobiologi Pengolahan Pangan Lanjut. PAU Pangan dan Gizi. IPB. Bogor.

FST6095220 Parasitology

Module Name	Parasitology
Module level, if applicable	Applied
Module Identification Code	FST6095220
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Narti Fitriana, M.Si.
Language	Indonesian
Relation in Curriculum	Electivecourse for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome
1. Able to explain terminology, concepts of parasites, hosts, vectors and predation 2. Able to explain diseases caused by parasites and their prevention efforts 3.
Module content
1. Introduction and basic concepts of parasites, hosts and predation 2. Parasitology terminology and its scope from an Islamic and scientific perspective 3. Parasitic Rhizopods and Sporozoa 4. Parasitic ciliates and flagellates 5. Parasitic arthropods 6. Parasitic trematodes 7. Parasitic cestodes 8. Tissue nematodes 9. Intestinal nematodes 10. Diagnosis of soil transmitted helminth eggs 11. Superficial mycoses 12. Systemic mycoses 13. Parasite research presentation 14. Parasite research presentation
Recommended Literatures 1. Gandahusada, S., Herry D. Illahude, Wita Pribadi.2014. Parasitologi Kedokteran edisi ketiga. Gakultas 2. Kedokteran UI. Jakarta 3. Onggowaluyo J., S. 2002. Parasitologi Medik I pendekatan Aspek Identifikasi, Diagnosis dan Klinik. Penerbit Buku Kedokteran. EGC. Jakarta 4. Irianto., K. 2009. Parasitologi berbagai penyakit yang mempengaruhi kesehatan manusia. CV Yrama Widya.Bandung 5. Noble, E. R. dan G. A. Noble. 1989. Parasitology : The biology of animal parasites. Lea and Febiger. Philadelphia (US). 6. Juni Prianti, L.A., Tcahaya PU., Darwanto. 2006. Atlas Parasitologi Kedokteran. Gramedia Pustaka Indonesia. Jakarta 7. CDC (2016). “Balantidiasis”. http://www.cdc.gov/dpdx/balantidiasis/. 8. Teguh Wahju Sardjono, Aswin Djoko Baskoro, Agustina Tri Endharti, Sri Poeranto. 2016. Parasitologi kedokteran dan veteriner. Universitas Brawijaya Press. Malang

FST6095221 Plant Ecophysiology

Module Name	Plant Ecophysiology
Module level, if applicable	Applied
Module Identification Code	FST6095221
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to analyse cases related to plant ecophysiology based on the concept of plant ecophysiology.	
Module content	
1. Basic concepts, history and development, as well as practical aspects of Plant Ecophysiology 2. Environmental factors that influence plant growth 3. Physiological adaptation of plants to face water stress 4. Physiological adaptation of plants to face salt or salinity stress 5. Physiological adaptation of plants to face temperature stress 6. Physiological adaptation of plants to face light stress 7. Physiological adaptation of plants to face stress of CO2 8. Physiological adaptation of plants to face pH stress and allelochemical compounds 9. Physiological adaptation of plants to face soil/nutrient stress 10. Physiological adaptations of plants to face excess inorganic fertilizers and pesticides 11. Physiological adaptation of plants to face biotic stress (beneficial) 12. Physiological adaptation of plants to face biotic (adverse) stress 13. Case study of plant ecophysiology in the environment (2 Meetings)	
Recommended Literatures 1. Bhatla, S.C. & Lal, M.A. (2018). Plant Physiology, Development and Metabolism. Springer Nature Singapore Pte Ltd. Singapore	

2. Lambers,H., Chapin, F.S.&Pons, T.L, R. E. (2008). Plant Phisiology Ecology. Springer Science Business Media, LLC, 233 Spring Street, New York, USA
3. Jurnal-jurnal penelitian internasional dan e-book terbitan kurang dari 10 tahun terakhir.
4. Artikel-artikel yang diterbitkan di media masa

FST6095222 Landscape Ecology

Module Name	Landscape Ecology
Module level, if applicable	Basic
Module Identification Code	FST6095222
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Etyn Yunita, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	

Students understand the mutual relationship between architecture, humans and the environment, and understand the concept of environmentally sound landscapes, so as to be able to provide solutions to environmental changes for landscape preservation
Module content
1. The meaning and limitations of Ecology Landscape 2. Components and interactions that occur in ecosystem 3. Ecosystem type 4. Analysis vegetation analysis on an area land 5. Components shaping and preservation efforts landscape 6. Ecological processes at landscapes 7. Biota landscape at spatial scale 8. Structure, function, and change landscape 9. Ecological principles landscape 10. Landscape elements 11. Diversity landscape 12. Balance and disturbance landscape ecology
Recommended Literatures 1. Heinz Frick dan Tri Hesti Mulyani. 2006. Arsitektur Ekologis – Konsep arsitektur ekologis di iklim tropis, penghijauan kota dan kota ekologis serta energi terbarukan. Penerbit Kanisius dan Soegijapranata University Press. 2. Heinz Frick dan FX Bambang Suskiyatno, 1998. Dasar-dasar Eko-arsitekur. Penerbit Kanisius dan Soegijapranata University Press. 3. Heinz Frick dan Tri Hesti Mulyani. 2006. Arsitek Ekologis. Penerbit Kanisius dan Soegijapranata University Press. 4. Joyce Marcella Laurens. 2004. Arsitektur dan Perilaku Manusia. Grasindo. Jakarta. 5. Monica G. Turner; Robert H. gardner; and Robert V. O'Neill. 2001. Lanscape Ecology in Theory and Practice. Springer-Verlag New York, Inc. 6. Otto Soemarwoto. 2004. Ekologi, Lingkungan Hidup, dan Pembangunan. Penerbit Djambatan. Jakarta 7. Wenche, E. Dramstad; James D. Olson; and Richard D.D. Forman, 1996. Lanscape Ecology Principles in Lanscape Architecture and Land - Use Planning. Harvard University Graduate School of Design, Island Press 8. Fitter Hay, AH. And Hay, R.K.M., 1981. Fisiologi Lingkungan Tanaman 9. Undang Undang No. 5 Tahun 1990, Tentang : Konservasi Sumberdaya Alam Hayati, Dan Ekosistemnya

FST6095223 Ethnobotany

Module Name	Ethnobotany
Module level, if applicable	Basic
Module Identification Code	FST6095223
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Priyanti, M.Si., Ardian Khairiah, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course students are able to analyse plants used by certain communities/ethnic groups for various purposes.	
Module content	
1. The concept of ethnobotany and economic botany 2. Ethnoecology concept 3. Ethnobotanical sampling method 4. Analysis of ethnobotanical data quantitatively and qualitatively 5. Ethnomedicine 6. Ethnobotany of traditional rituals 7. Ethnobotany of food plants 8. Ethnobotany of garden plants 9. Valuation of medicinal plants 10. Valuation of food crops 11. Valuation of building materials plants 12. Valuation of insect repellent plants. 13. Ethnotaxonomy 14. Community knowledge about landscape ecology	
Recommended Literatures	

10. Martinez, J. L., Acevedo, A. M., & Rai, M. 2019. Ethnobotany: aplication of medicinal plants. CRC Press. France.
11. Ozturk, M. & Hakeem, K. R. 2018. Plant and Human Health Volume I: Ethnobotany and Physiology. Springer
12. Artikel-artikel dari website dan media lain yang sesuai

FST6095224 Embryology

Module Name	Embryology
Module level, if applicable	Basic
Module Identification Code	FST6095224
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Fahri Fahrudin, M.Si.
Language	Indonesian
Relation in Curriculum	Electives course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to	

apply biological concepts and their applications with relevant knowledge. Students are able to explain the basic concepts of embryology including the principles of development and growth of animal cells. Students are able to reveal the mechanisms and processes of organogenesis and metamorphosis in animals. Students are able to analyze the factors that regulate organogenesis and their clinical relevance
Module content
1. Development and scope of embryology 2. Basic concepts and principles of development 3. Gametogenesis (Spermatogenesis and Oogenesis) 4. Fertilization and cleavage 5. Gastrulation and Neurulation 6. Placenta formation, implantation, and formation of extra embryonic layers 7. Ectoderm-derived organogenesis and development of the nervous system. 8. Ectoderm-derived organogenesis and development of the eye and ear. 9. Mesoderm-derived organogenesis and development of the urogenital system. 10. Endoderm-derived organogenesis and development of the digestive system 11. Endoderm-derived organogenesis and development of the respiratory system. 12. Regulatory factors of organogenesis (genetic and epigenetic) 13. Teratology. 14. Metamorphosis (perfect and imperfect as well as regressive and repressive).
Recommended Literatures 1. Gilbert, S.F., & Barresi, M.J.F. 2019. Developmental Biology, 12 Ed. Sunderland, Massachusetts USA: Sinauer Associates, Inc. 2. Sadler, T.W. 2012. Langman's Medical Embryology, 12th Ed. Philadelphia: Lippincott Williams & Wilkins. 3. Hart, P.J.B., & Reynolds, J.D. 2002. Handbook of Fish Biology and Fisheries. Malden: Blackwell Publishing. 4. Poernomo, B. 1999. Teratology High Light. Surabaya: Post Graduate Program. Airlangga University. 5. Tortora, G.J., & Derrickson, B. 2009. Principles of Anatomy and Physiology, 12 Ed. Hoboken: John Wiley & Sons, Inc. 6. Webster, S., & de Wreede, R. 2017. At a glance embryology. Jakarta: Penerbit Erlangga.

FST6095225 Waste Management

Module Name	Waste Management
Module level, if applicable	Applied
Module Identification Code	FST6095225
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud., Etyn Yunita, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to analyse cases related to waste management based on the concept of waste management that can be used for writing observation reports and other practice-oriented case study research. observation and other practice-oriented case study research.	
Module content	
1. The concept of waste and its management 2. Global environmental problems 3. Solid waste 4. Solid waste processing 5. B3 waste and its management 6. Case study 7. Infected waste 8. Liquid waste management 9. Drinking water treatment 10. Measurement of environmental parameters 11. Case study 12. Presentation	
Recommended Literatures	

1. John Pichtel. 2014. Waste Management Practices: Municipal, Hazardous, and Industrial. CRC Press, Taylor & Francis group. New York.
2. UNEP. 2005. Solid waste management. Ca Recovery. Inc.
3. Lagrega, Michael D. 2001. Hazardous Waste Management. Mc-Graw Hill.
4. Oil guide to algae-based wastewater treatment. www. Clixoo.com
5. Connell D.W. dan G.J. Miller. 1995. Kimia dan Ekotoksikologi Pencemaran. UI Press. Jakarta.
6. Ministerial Decree and Ministerial Regulation on Waste and the Environment
7. International research journals and e-books published less than the last 10 years.
8. Articles published in mass media

FST6095226 Environmental Biotechnology

Module Name	Environmental Biotechnology
Module level, if applicable	Applied
Module Identification Code	FST6095226
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation

Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able analyse the principles and/or applications of biology in improving and maintaining environmental quality, preventing environmental contamination, as well as its role in producing clean products.	
Module content	
1. Introduction (scope, history, development of environmental biotechnology) 2. Management of solid organic waste 3. Management of liquid organic waste 4. Bioremediation of crude oil pollutants 5. Bioremediation of xenobiotic pollutants 6. Biodegradation of plastic waste 7. Biosorption of heavy metals 8. Biofertilization 9. Pest biocontrol 10. Biogrout 11. Biomass production from waste 12. Bioenergy production 13. Biotechnology to prevent environmental contamination 14. Omics in environmental biotechnology	
Recommended Literatures 1. Atlas, R. M. and Bartha, R. Microbial Ecology Fundamentals And Applications. Benjamin Cummings Publishing Company Inc., California. 2. Rittmann, B. E. and P. L. McCarty. Environmental Biotechnology, Principles and Applications. McGraw Hill. 3. Evans, G. M. and J. C. Furlong. Biotechnology. John Wiley & Sons, Ltd. 4. Jordening, H. –J. and J. Winter. Environmental Biotechnology. Wiley-VCH Verlag. 5. Dahiya, A. Bioenergy, Biomass to Biofuels. Academic Press. 6. Kaiser, J. Bioindicators and Biomarkers of Environmental Pollution and Risk Assessment. Science Publisher. 7. Rawlings, D. E. and D. B. Johnson. Biomining. Springer-Verlag. 8. Research articles published in international journals within the last 10 years.	

FST6095227 Plant Biotechnology

Module Name	Plant Biotechnology
Module level, if applicable	Applied
Module Identification Code	FST6095227
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Dasumiati, M.Si.
Language	Indonesian
Relation in Curriculum	Electives course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant

	examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min)x14 wks= 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to analyze the process of gene transformation and plant genetic engineering, as well as their use in the fields of agriculture, health, environment and industry.	
Module content	
1. The concept and scope of plant biotechnology, the history of the development of plant biotechnology 2. Problems and issues: trends and developments in plant biotechnology in developing and developed countries, as well as the pros and cons of plant biotechnology 3. Genes, genomes and plant genomics as the basis of plant biotechnology 4. Plant transformation, Gene isolation; primary; amplification; gene cloning: vector selection; marker genes (antibiotic resistance), reporter genes (GUS, GFP) 5. Plant transformation II. Gene transfer using vectors (Agrobacterium, viruses) and physical chemical methods (microinjection; particle bombardment) 6. Plant transformation III. Post-Transformation Gene Verification: Hybridization, blotting, sequencing, immunoassay 7. Plant genetic engineering techniques, overexpression, gene knockout, antisense, RNAi 8. Genetic engineering of plants I. Resistance to biotic stress (herbicides, insects, diseases, viruses); immunology 9. Plant genetic engineering II. Resistance to abiotic stress (temperature, drought, salinity) 10. Plant genetic engineering III. Golden rice, secondary metabolites 11. Applications of plant genetic engineering: case examples and applications in the fields of agriculture (food) and health	

12. Applications of plant genetic engineering: case examples and applications in industry and the environment 13. Biotechnology in the framework of molecular markers: Techniques, types and their use in plant biotechnology products. 14. Bioethics and Regulation of plant biotechnology products: Regulation and safety of biotechnology products, Biotechnology research ethics law in Indonesia
Recommended Literatures 1. William G. Hopkins. 2007. Plant Biotechnology. Chelsea House Publishers 2. N.Steward Jr (Ed.). 2008. Plant Biotechnology and Genetics: Principles, Techniques, and Applications. Wiley and Sons, Inc. 3. Griffith, Gelbart, Lewontin, Miller. 2002. Modern Genetic Analysis 2nd Edition. Freeman Co. 4. International research journals and e-books published less than the last 10 years. 5. Articles published in mass media

FST6095228 Introduction to Environmental impact analysis

Module Name	Introduction to Environmental impact analysis
Module level, if applicable	Applied
Module Identification Code	FST6095228
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr.Agus Salim, S.Ag,M.Si., Ir. Etyn Yunita, M.Si
Language	Indonesian
Relation in Curriculum	Compulsory course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems and issues and their applications. Students are able to explain the meaning, process and benefits of Environment Impact Analysis for development activities. Students are able to apply the process of preparing and evaluating Environment Impact Analysis documents according to the regulations applicable in Indonesia. Students are able to interpret whether or not a business plan and/or activity is required to have an Environment Impact Analysis document. Students are able to make the right decisions based on data and information collected in the preparation and assessment of Environment Impact Analysis documents.	
Module content	
1. Introduction and Basic Concepts of Environment Impact Analysis 2. Legislation related to Environment Impact Analysis in Indonesia 3. Environment Impact Analysis Procedures include Screening of Business Plans and/or Mandatory Environment Impact Analysis Activities 4. Initial Environmental Baseline and Description of Business Plans and/or Activities 5. Scoping Process in Environment Impact Analysis 6. Preparation of Environment Impact Analysis Documents 7. Procedure for Evaluating Environment Impact Analysis Documents	
Recommended Literatures 1. Canter, L.W. 1996. “Environmental Impact Assessment”, 2nd Edition. McGraw-Hill, New york. 2. Soemarwotto, O. 2005. Analisis Mengenai Dampak Lingkungan. Gadjah Mada University Press, Yogyakarta. 3. Suratmo, G.F. 1998. Analisis Mengenai Dampak Lingkungan, Edisi 8, Gadjah Mada University Press, Yogyakarta 4. Kementerian Lingkungan Hidup dan Kehutanan. 2016. Himpunan Peraturan tentang Lingkungan Hidup.	

FST6095229 Immunology

Module Name	Immunology
Module level, if applicable	Applied
Module Identification Code	FST6095229
Semester(s) in which the module is taught	6
Person(s) responsible for the module	drh. Raden Rara Bhintarti Suryohastari, M.Biomed
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students master the concepts, theories, methods of collection and analysis in medical science systematically, especially disaster science and/or tropical diseases	
Module content	
● The body's reaction to foreign bodies both non-microorganisms and microorganisms ● The body's nonspecific and specific defence mechanisms in the event of infection ● Differences in reactions caused by antigens and immunogens and antibodies in carrying out their role as the body's defence against infection ● The mechanisms by which humoral and cellular defences of the body work against infection ● The lymphoid organ system in maturing the body's defence cells ● Diseases caused by abnormalities of the immune system ● Disease treatments that use vaccines	
Recommended Literatures ● Davison F., Kaspers B., and Schat K.A. 2008. Avian Immunology. First ed. Academic Press Elsevier, 496 pages. ● Hentges DJ. 1995. Microbiology & Immunology. Second Edition. Little, Brown and Company, Boston, New York, Toronto, London. ● Gershwin LJ., Krakowka S., and Olsen RG. 1995. Immunology and Immunopathology of Domestic Animals. Second Edition.	

- Kresno, S.B. 2001. Immunologi: Diagnosis dan Prosedur Laboratorium. Edisi keempat, Pen. Fakultas Kedokteran Universitas Indonesia, Jakarta.
- National Institute of Allergy and Infectious Disease. 2003. Understanding The Immune System: How It Works. National Cancer Institute, Department of Health and Human Service, National Institute of Health, 57 pages. www.nci.nih.gov dan www.niaid.nih.gov
- Pastoret P.P., Griebel P., Bazin H., and Govaerts. 1998. Handbook of Vertebrate Immunology. 98 ed. Academic Press Limited, London. 698 pages.
- Roitt IM and Delves PJ. 2001. Roitt's Esential Immunology. Tenth Edition, Blackwell Science Ltd. Osney Mead
- Oxford OX2 OEL. 8. Tizard IR. 1996. Veterinary Immunology an Introduction. Fifth Edition, WB Sounders Company, a Division of Harcourt Brace and Company. The Curtis Center Independence Square West, Philadelphia, Pennsylvania

FST6095230 Halal Food

Module Name	Halal Food
Module level, if applicable	Applied
Module Identification Code	FST 6095230
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Sandra Hermanto, M.Si
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None

Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

1. Students are able to construct their knowledge and re-explain concepts related to the philosophy, legal basis and halal analysis of food products, halal product guarantee systems and halal food regulations at the industry and community levels.
2. Students are able to apply material knowledge in identifying critical points of halalness of a food product.
3. Students understand the principles, criteria and implementation of the Halal Guarantee System and its relation to the Halal Food Regulation Act

Module content

1. Essence, Philosophy and Legal Basis of Halal Food
2. Controversy of Halal Food Products
3. Knowledge of ingredients & Identification of Critical Points (Animal, Vegetable, Microbial and Synthetic)
4. General guidelines for abattoir production
5. Food Regulation Law & JPH Law
6. Implementation of Halal Regulation Law
7. Halal Product Guarantee System (SJPH)
8. Halal Certification Guidelines & Implementation of SJPH

Recommended Literatures

- Dr. Ir. Anton Apriyantono, MS., 2004, Teknologi & Manajemen Pangan Halal, Fakultas Teknologi Pertanian, IPB.
- Dr. Yusuf Qardhawi, 1993, Halal & Haram dalam Islam. Bina Ilmu. Jakarta.
- Mian N. Riaz, Muhammad M. Chaudry, 2004, Halal Food Production, CRC Press LLC, USA.
- Da Wen Sun, 2008, Modern Techniques for Food Authentication, Elsevier, 30 Corporate Drive, Suite 400, Burlington, MA 01803, USA.
- Lembaga Pengkajian Pangan, Obat-obatan & Kosmetika, 2008, Panduan Umum Sistem Jaminan Halal.
- Dirjen LPPOM Depkes RI, Peraturan Pemerintah No. 69 tahun 1999 tentang Pangan.
- Undang-undang Republik Indonesia Nomor 8 Tahun 1999, Tentang Perlindungan Konsumen.
- Undang-undang No 33 Tahun 2014, tentang Jamina Produk Halal.

FST6095231 Malacology

Module Name	Malacology
Module level, if applicable	Basic
Module Identification Code	FST6095231

Semester(s) in which the module is taught	6
Person(s) responsible for the module	Narti Fitriana, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students master the theoretical concepts of the fundamentals of Malacology and its application	
Module content	
● History, Definition and Classification, Mollusca Diversity, Mollusca Biology, Potential, Geography. ● Malacology and its environment (Mollusca and its characteristics, Habit and Habitat, Distribution of Marine Mollusca, Terrestrial Mollusca Distribution, Abnormalities of Marine Mollusca. ● Class Amphineura & Class Monoplacophora (Class Amphineura, Class Monoplacophora, Morphology & Anatomy of Amphineura & Monoplacophora classes (Growth, shell structure, shell shape, shell ornamentation, colour and pattern), Physiology & Reproduction of Amphineura & Monoplacophora classes, Ecology, Potential and Conservation. ● Class Scaphopoda, Morphology & Anatomy of class Scaphopoda (Growth, shell structure, shell shape, shell ornamentation, colour and pattern), Physiology &	

Reproduction of class Scaphopoda, Ecology, Potential and Conservation. Sample collection methods.

- Bivalve Class and Application of modelling: (Field Biology) (Bivalve Classes (Classification), Morphology & Anatomy of the Bivalve class (Growth, shell structure, shell shape, shell ornamentation, colour and pattern), Physiology & Reproduction of the Bivalve class, Ecology, Potential and Conservation, Sample collection methods, application of field biological modelling, Cultivation and Application of freshwater, estuary and marine Bivalves.
- Gastropod Classes (Terrestrial & Aquatic Gastropod Classes, Morphology & Anatomy of the Gastropod class (Growth, shell structure, shell shape, shell ornamentation, colours and patterns), Physiology & Reproduction of the Gastropod class Gastropods, Ecology, Potential and Conservation, Terrestrial Gastropods that are pests and their control, Predatory aquatic gastropods and their application.
- Class Cephalopods (Class Cephalopods, Morphology & Anatomy, Physiology & Reproduction of the Gastropod class, Ecology and Conservation, Potential and applications.
- Sampling Methods and Research Applications of Mollusca (Gastropoda &
- Cephalopods) , Mollusca (Gastropoda & Cephalopod) culture development concept.

Recommended Literatures

- Abbott R. T. The Pocket Guide to SEASHELLS OF THE NORTHERN HEMISPHERE. Singapore.
- Dharma B. 2005. Recent & Fosil' INDONESIAN SHELLS' . Jakarta.
- Dance, S. P. 1974. The Collector's Encyclopedia of SHELLS. Mc Graw-Hill Book Company. New York. TORONTO.
- Jutting, V.B. 1956. Treubia A Journal of Zoology Hidrobiology and Oceanography of The Indo-Australian Archipelago. Museum Zoologicum Bogorience, Kebun Raya Indonesia Bogor-Java.
  Jutting V.B. 1931. Notes on Fresh Water Mollusca from the Malay Archipelago. Repr. Treubia.
- Kastawi, Y., Indriwati, S. E., Ibrohim, Masjhudi, Rahayu S. E. 2005. Zoologi Avertebrata. Universitas Negeri Malang.
- Marshall, A.J. and W.D. Williams. 1972. Text Book of Zoology, Vol I. Invertebrates. 7 ed . The Mac Nillan. Press Ltd.
- Roberts D., Soemodihardjo S., Kastoro W. 1982. Shllow Water Marine Molluscs Of North-West Java. Lembaga Oseanology Nasional-LIPI. Jakarta.

FST6095232 Primatology

Module Name	Primatology
Module level, if applicable	Applied
Module Identification Code	FST 6095232
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Fahma Wijayanti, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course: ● Students are able to explain the relationship and role of Primatology with the discipline of Biology ● Students are able to distinguish, identify and classify primate ● Students are able to explain Living Primates as a product evolution of genetics, morphology, and behaviour ● Students are able to explain primates proportionally and scientifically ● Students are able to explain the comparison between human being with primate animals from the point of view of biology and evolution. ● Students are able to find problems and design appropriate primatology research methods.	
Module content	
1. Introduction to Primatology 2. Primate Classification and Distribution 3. Primate Biogeography 4. Teeth, food and digestion 5. Growth and development 6. Primate Social Groups 7. Social behaviour 8. Social relationships	

9. Feeding ecology 10. Reproductive strategies 11. Primate communities 12. Primate research methods 13. Primate conservation 14. Primate research trends (topic of interest)
Recommended Literatures ● Swindler, D. R. 1998. Introduction to the Primates. University of Washington Press. Seattle. ● Rowe, N. 1996. The Pictorial Guide of the Living Primates. Pogonias Press. New York. ● Strier, K. B. 2003. Primate Behavioral Ecology, 2nd edition. Allyn and Bacon. New York. ● Smuts, B. B., Cheney, D. L., Seyfarth, R. M., Wrangham, R. W & Struhsaker, T. T. 1987. Primate Societies. The University of Chicago. Chicago. ● Shumaker, R. W., Beck, B. B. 2003. Primates in questions. Smithsonnian Books. Washington.

FTK6017150 Strategies and Learning Biology

Module Name	Strategies and Learning Biology
Module level, if applicable	Basic
Module Identification Code	FTK6017150
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Prof. Dr. Zulfiani, M.Pd
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS

Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

- Explains the concepts, principles and benefits of teaching and learning
- Analyzes the concept of high school learning in the independent curriculum
- Developing learning and assessment designs
- Analyzing RPP Plus/Teaching Modules and Learning Objective Flow (ATP)
- Identify teaching materials such as LKPD, modules and handouts.
- Analyzing Computer Information Technology (ICT) based media in learning and assessment
- Analyzing Criteria for Completion of Learning Objectives (KKTP) and development of Annual Programs and Semester Programs

Module content

- Learning and Teaching,
- Learning Materials
- Learning Concepts, Literacy Issues, SDGs, technology in the Independent Curriculum,
- Competency Based Learning Design
- Development of Teaching Modules and ATP,
- Management and development of teaching materials: E LKPD and E Module,
- Development of IT learning media
- Assessment
- Prota and Prosem.

Recommended Literatures

- Pengajaran sebagai suatu sistem [Ibrahim & Syaodih,N. 1996: 51-54] Hamalik, O. 2009: 8-12] [Harjanto, 2008: 44-55]
- Desain Pembelajaran [Hamzah B. Uno dkk, MQ Publishing]
- Arends. (1989). Learning To Teach. Singapore: Mc. Graw. Hill. Pendukung
- Carin, Arthur A, and Sund Robert B (1990). Teaching Science Through Discovery. Colombus, Ohio : Meril Publishing Rutherford, J, F., & Ahlgren A. (1990). Science For All Americans. New York: Oxford University Press.
- National Research Council. (2002). Inquiry and The National Science Education Standard: A Guide for Teaching and Learning. Washington DC: National Academy Press.
- Kurikulum Merdeka Kemendikbud
- Keputusan Rektor No 864 2017 Pedoman Integrasi Ilmu UIN Syarif Hidayataullah Jakarta
- Modul Blended Learning Perencanaan Pembelajaran Biologi, 2023

FTK6017153 Media and Technology Learning Biology

Module Name	Media and Technology Learning Biology
Module level, if applicable	Basic
Module Identification Code	FTK6017153
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Baiq Hana Susanti,M.Sc
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Designing biology learning media by applying the latest technology associated with the basis of technology in Islam and the role of Muslim scientists in initiating the formation of the role of Muslim scientists in initiating the formation of technology	
Module content	
1. Definition and characteristics of learning media in general 2. Specific definitions and characteristics of Biology learning media 3. Characteristics of each type of Biology learning media 4. Biology learning media based on the characteristics of the material 5. General function of Biology learning media 6. Special function of Biology learning media	

7. Aspects needed in choosing biology learning media based on student needs with multiple intelligence based. 8. How to analyze Biology material to the needs of teaching media and learning media 9. Practice of analyzing Biology material to the needs of teaching media and biological learning media 10. Theory of designing Biology learning media (based on principles, functions, and implementation). 11. Effective Biology learning media
Recommended Literatures ● Arsyad A. (2003). Media Pembelajaran. Jakarta: Raja Grafindo Persada. ● Brown, J. W., Lewis, R. B., Harcleroad, F. E. (1959). A-V Instruction: Materials and Methods. New York: McGraw-Hill Book Company, Inc. ● Sadiman, A. S., Rahardjo, R., et. al. (1986). Media Pendidikan: Pengetian, Pengembangan, dan Pemanfaatannya. Jakarta: Raja Grafindo Persada. ● Kemp, J.E. & Dauton, D. K. (1985). Planning and Producing Instructional Media(Fifth Edition). New York: Happer & Row, Publishers. ● Bloom, Benyamin. S., et.al (1961). Evaluation to Improve Learning. New York: Graw-Hill Book Company. ● Cole P. G. & Chan L. K. S. (1994). Teaching Principle and Practice. New Jersey: Prentice Hall. 7. Smaldino, S. E. et.al. (2005). ● Instructional Technology and Media for Learning (Eight Edition). New Jersey, Ohio: Pearson Prentice-Hall, Inc ● Keputusan Rektor No 864 2017 Pedoman Integrasi Ilmu UIN Syarif Hidayataullah Jakarta ● Modul Blended Learning Perencanaan Pembelajaran Biologi, 2023

FTK6017155 Evaluation of Biology Learning

Module Name	Evaluation of Biology Learning
Module level, if applicable	Basic
Module Identification Code	FTK6017155
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Dr. Ahmad Sofyan, M.Pd.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h

	• Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
• Integrating knowledge of the concept of learning evaluation with Islamic values in the application of TPACIK • Analyse learning evaluation problems in schools/madrasas • Communicate alternative solutions to learning evaluation problems based on analysis	
Module content	
• Basic concepts of learning evaluation and regulations related to educational assessment standards • Authentic Assessment: Aspects of Assessment in the Cognitive, Affective and Psychomotor Domains • Learning Outcome Test Preparation and Implementation Techniques • Techniques for Preparing Grids and Test Instruments: High Cognitive Questions • Learning Process Evaluation Tools: Self Assessment, Peer Assessment, Observation/Journal, Portfolio • Problem Item Analysis Technique • Benchmark Assessment and Normative Assessment • Test Result Correction and Scoring Techniques • Mastery Learning • National Assessments (character Survey and Learning Environment Survey)	
Recommended Literatures • Anastasi, Ane & Susana Urbina, (2000) Psychological Testing, New Jersey:: MacMillan Publishing Company • Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of educational objectives (Complete ed.). Longman. • Arikunto, (2013). Dasar-Dasar Evaluasi Pendidikan. Jakarta: Bumi Aksara • Arifin, Zainal. (2009). Evaluasi Pembelajaran. Jakarta: Departemen Agama RI • Aiken, Lewis.& Gary Groth-Marnat. (2009). Pengetesan dan Pemeriksaan Psikologi Jilid 1 dan 2, Jakarta: PT Indeks	

- Arikunto, Suharsimi. (2005). Dasar-dasar Evaluasi Pendidikan. Jakarta: Bumi Aksara
- Azwar, Saifuddin, (2012). Penyusunan Skala Psikologi. Yogyakarta: Pustaka Pelajar
- Bloom, B. S et al. (1991). Handbook on Formative and Sumative Evaluation of student Learning. New York: David Mc Kay Co.
- BSNP. (2007). Standar Penilaian Pendidikan. Jakarta: Depdiknas.
- Budimansyah, Dasim. (2003). Penilaian Portofolio. Bandung: Genesindo..
- Cohen, Ronald Jay & Mark E. Swerdlik. (2010). Psychological Testing and Assessment. New York: McGraw-Hill
- Djaali, Pudji Muljono, dan Ramli. (2008). Pengukuran dalam Bidang Pendidikan. Jakarta: PPs. UNJ.
- Kemendikbud. (2015). Panduan Penilaian untuk Sekolah Menengah Atas. Direktorat Jenderal Pendidikan Dasar dan Menengah. Jakarta
- Kemendikbud. (2016). Peraturan Menteri Pendidikan dan Kebudayaan Nomor 23 Tahun 2016 tentang Standar Penilaian Pendidikan.
- L.W. Anderson dan D.R. Krathwohl, Terjemah: Agung Prihatono. (2010). Pembelajaran, Pengajaran dan

FTK6017158 Planning Learning Biology

Module Name	Planning Learning Biology
Module level, if applicable	Basic
Module Identification Code	FTK6017158
Semester(s) in which the module is taught	6
Person(s) responsible for the module	Prof. Dr. Zulfiani, M.Pd
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS

Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

- Able to explain the significance of the role and competence of teachers in managing learning
- in accordance with the 2013 Curriculum.
- Able to analyze biology material according to the characteristics, teaching procedures at the high school level
- independently and appropriately.
- Able to design biology learning activities based on science process skills independently and with quality.
- independently and with quality
- Able to present analyses of methods, approaches, and models of learning
- learning models based on constructivism by utilizing information technology independently and responsibly.
- independently and responsibly.
- Able to design classroom and laboratory management that supports active learning independently and with quality.
- independently and with quality.

Module content

- The role and competence of biology teachers in managing learning in accordance with the 2013 curriculum
- Analyze biological material according to the characteristics of the types of factual, conceptual, procedural, metacognitive knowledge and cognitive development of students at the high school level independently and appropriately.
- Organize of biological material independently and appropriately
- Design biology learning activities based on science process skills independently and with quality
- Analysis of methods, approaches by utilizing information technology independently and responsibly
- Able to present analysis of constructivism-based biology learning models by utilizing information technology independently and responsibly.
- Able to design classroom and laboratory management that supports active learning independently and with quality.

Recommended Literatures

- Arends. (1989). Learning To Teach. Singapore: Mc. Graw. Hill.
- Carin, Arthur A, and Sund Robert B (1990). Teaching Science Through Discovery. Colombus, Ohio : Meril Publishing Co.
- Colburn, A. (2005). Science Inquiry-What is it and How Do You Do http://www.wavco.org/wvc/cadre/waterquality/scienceinq.htm. [10 Juli 2005].
- Crawford, B.A. (2000). Embracing the Essence of Inquiry. Journal of Research of Science Teaching. 37(9) 916-937.

- Dahar, R.W. (1996). Teori-Teori Belajar. Jakarta: Erlangga. 6. GLEF (George Lucas Educational Foundation). (2001). Project based Learning It?. Tersedia: Research. Edutopia online. Tersedia: http://www.glef.org/php/article.php?id=Art_887 [12Desember 2004]
- Joyce, B., Weil, M., & Calhoun, E.(2000). Models of Teaching. London: Prentice Hall International.
- Johnson, E.B. (2002). Contextual Teaching and Learning. California: Corwin Press, Inc.
- Flemming, N. D. (1995). Modes of Presentation (V.A.R.K.) in the Tertiary Classroom. In A. Zelmer (ed.), Research and development in higher education. Proceedings of the annual conference of the higher education and research development society of Australia (HERDSA), vol. 18, pp. 308–313.
- National Research Council. (2002). Inquiry and The National Science Education Standard: A Guide for Teaching and Learning. Washington DC: National Academy Press. 11. Rutherford, J, F., & Ahlgren A. (1990). Science For All Americans. New York: Oxford University Press.
- Tobing, R.L. (1982). Keterampilan dan Teknik Bertanya. Bahan Penelitian P3G Bandung:PPGA IPA
- Suchman, J.R. (2005). Inquiry Model of Teaching. Tersedia: http://scied.gsu.edu/Hassard/mos/7.4.html [7 Mei 2005]
- Suparno, P. (1997). Filsafat Konstruktivisme dalam Pendidikan. Yogyakarta: Penerbit Kanisius.
- Kurikulum Berbasis Kompetensi, Kurikulum 2006 (KTSP) dan Kurikulum 2013 untuk SMP dan SMA
- Keputusan Rektor No 864 2017 Pedoman Integrasi Ilmu UIN Syarif Hidayataullah Jakarta
- Zulfiani, Feronika, T., Suartini, K. (2010) Strategi Pembelajaran Sains. Jakarta Puslitpen

FST6095233 Industrial Microbiology

Module Name	Industrial Microbiology
Module level, if applicable	Applied
Module Identification Code	FST6095233
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Megga Ratnasari Pikoli, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.

Workload	• Lecture (class): (2 x 50 min) x 14 wks = 23,33 h • Structured activities: 2 h x 14 wks = 28 h • Independent study: 2 h x 14 wks = 28 h • Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; • Total = 82,66 h • 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to explain biological concepts supported by other relevant knowledge to understand developing problems, issues, and their applications. Students are able to use standard methodologies to solve problems related to biology and their implementation. Students are able to demonstrate the results of conceptual, analytical, logical and innovative thinking in oral and written form. Students are able to build bioentrepreneur skills. Students are able to analyze the principles and/or applications of microbiology in using microorganisms to produce commercialized products.	
Module content	
• Introduction (scope and development of industrial microbiology) • Industrial microorganisms • Isolation of industrial microorganisms • Preservation of isolates • Fermentation media and inocula • Selection of microorganisms and their products • Development of strains and products • Fermentation models and kinetics • Metabolite production using immobilized cell technique • Scale-up • Downstream processes • Examples of industrial microbiology application	
Recommended Literatures • Okafor, N., & Okeke, B. C. (2017). Modern industrial microbiology and biotechnology. CRC Press. • Wilson, D. B., Sahm, H., Stahmann, K. P., & Koffas, M. (Eds.). (2019). Industrial Microbiology. John Wiley & Sons. • International research journals and e-books published less than the last 10 years.	

FST6095235 Phytopathology

Module Name	Phytopathology
Module level, if applicable	Applied
Module Identification Code	FST6095235
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Priyanti, M.Si., Junaidi, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
Students are able to apply biological concepts and their applications with relevant knowledge. Students are able to demonstrate the results of conceptual, analytical, logical and innovative thinking in oral and written form. Students are able to analyze the symptoms and control of plant diseases	
Module content	
1. Understanding Phytopathology and its relationship to relevant science 2. Types of diseases that attack plant organs 3. Development of disease in plants 4. Symptoms of plant disease 5. Plant resistance to disease	

6. Plant diseases in seeds and their control 7. Plant diseases in seedlings and their control 8. Root plant diseases and their control 9. Plant diseases of stems and their control 10. Leaf plant diseases and their control 11. Plant diseases of flowers and their control 12. Plant diseases of fruit and their control 13. Observation of sick plants in plantations and yards 14. Presentation of the variety of cultivated plants
Recommended Literatures 1. Sutarman. 2017. Dasar-dasar Ilmu Penyakit Tanaman. Sidoarjo. Umsida Press. 2. Sharma, J.N., Karthikeyan, G. & Singh, S.M. 2017. Fundamentals of Plant Pathology. Agrimoon.Com

FST6095236 Plant breeding

Module Name	Plant breeding
Module level, if applicable	Applied
Module Identification Code	FST6095236
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Dasumiati, M.Si., Ir. Junaidi, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture

Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

After completing this course, students are able to analyse the genetic diversity of plants as a source or result of plant breeding based on plant breeding methods that can be used for writing observation reports and other practice-oriented case study research.

Module content

1. Concept and scope of plant breeding: concept, scope and contribution of plant breeding
2. Plant reproduction: plant sex determination, sexual and asexual reproduction
3. The basis of genetics in plant breeding
4. Diversity and sources of genetic diversity: Breeding methods (introduction, collection, hybridization, mutation, polyploid), type of cultivar/variety
5. Heritability: Understanding genotypic, phenotypic, environmental variance; Heritability, narrow and broad sense of heritability, use of heritability for breeding
6. Methods of selection and breeding of self-pollinated plants: Genetic characters in self-pollinated plants, Homozygosity, Introduction, mass selection, line selection
7. Methods of selection and breeding of self-pollinated plants: Hybridization/crossing, Selection methods for hybridization results (pedigree selection, bulk, backcross, SSD)
8. Selection and Breeding methods for cross-pollinated plants: Genetic characters of cross-pollinated plants, Hardy-Weinberg Law, Introduction, mass selection, cob row selection
9. Methods of selection and breeding of cross-pollinated plants: Repeated selection, phenotypic repeated selection, repeated selection for combining ability, reciprocal repeated selection
10. Vegetative plant breeding methods: Reasons for vegetative propagation, breeding procedures, development of cloned cultivars/varieties, apomixis, potato and sugarcane plant breeding
11. Hybrid plant assembly: definition of hybrid plants, plant breeding methods in hybrid plant assembly, heterosis
12. Conventional and unconventional breeding technologies: Conventional (Crossing, clonal), Unconventional (Genetic engineering, mutation)
13. Biotechnology for breeding: Biotechnology for genetic diversity, biotechnology for selection, biotechnology in in vitro culture
14. Release of varieties: Sources of genetic diversity, Crossing/genetic engineering, Selection, Testing of breeding results (yield test, genetic progress), Procedures for releasing varieties

Recommended Literatures

1. Acquaah, G. 2012. Principles of Plant Genetics and Breeding (2nd Edition). Wiley-Blackwell
2. Griffiths, A.J.F., J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. 2010. An Introduction to Genetic Analysis (Tenth Edition)
3. Poespodarsono S. 1988. Dasar-dasar Ilmu Pemuliaan Tanaman. Bogor (ID): PAU.

4. Roy D. 2000. Plant Breeding, Analysis and Exploitation of Variation. New delhi (IN): Narosa Publishing House
5. International research journals and e-books published less than the last 10 years.
6. Articles published in mass media

FST6095237 Environmental Toxicology

Module Name	Environmental Toxicology
Module level, if applicable	Applied
Module Identification Code	FST6095237
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	

After completing this course, students are able to explain the concept of toxicology, types of toxins, and the effects of toxic substances on the environment, both land, water and air, as well as their effects on the environment, and the effects of toxic substances on the environment, both land, water and air, as well as their effects on human health, and express it in a research theme.
Module content
1. Basic concepts of environmental toxicology 2. Xenobiotics: microbes 3. Xenobiotics: plants and animals 4. The process of entering chemical substances into the body 5. Ecokinenetics of toxic substances 6. Dose-response concept 7. Presentation of group assignments/field trips 8. Pesticide toxicology 9. The fate of pesticides in the environment 10. Heavy metal toxicology 11. Toxicity testing methods 12. Pollution and quality of the aquatic environment 13. Group assignment presentation 14. Group assignment presentation
Recommended Literatures 1. Amdur M.O, J, Doull & C.D. Klaassen. 1991. Casarett and Doull's Toxicology: The Basic Science of Poisons. Mc Graw-Hill, Inc. United States of America. 2. Soemirat, J. 2015. Toksikologi Lingkungan. UGM Press 3. Loomis, T.A. 1978. Toxicology Dasar. Lea & Febiger, Philadelphia. 4. Landis, W.G & Ming H,Y. 1995. Introduction of Environmental Toxicology. Lewis Publishers, Tokyo. 5. Connell D.W. dan G.J. Miller. 1995. Kimia dan Ekotoksikologi Pencemaran. UI Press. Jakarta. 6. International research journals and e-books published less than the last 10 years. 7. Articles published in mass media

FST6095238 Biomaterials and Nanotechnology

Module Name	Biomaterials and Nanotechnology
Module level, if applicable	Applied
Module Identification Code	FST6095238
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud., Dr. Agus Salim, S.Ag., M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology

Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course students are able to design biomaterial and nanomaterial synthesis procedures that can be applied in the health sector, then report the results of the design and write articles related to nanotechnology in online media.	
Module content	
1. History of biomaterials 2. Definition and principles of biomaterials 3. Natural biomaterials 4. Synthetic biomaterials 5. Biomaterial applications in the health sector 6. Basic principles of nanotechnology 7. Properties of nanomaterials 8. A quantum nano approach 9. Types of nanomaterials 10. Nanomaterial synthesis techniques, bottom up and top down 11. Characterization of nanomaterials 12. Nanomaterial applications in several fields 13. Nanotechnology applications in biomaterials	
Recommended Literatures	

1. Park J nd Lakes, R.S. 2007. *Biomaterials: An Introduction*. Springer Science & Business Medi
2. Fahmi, M.Z dan Wibrianto, A. 2021. *KIMIA NANO: Konsep, Sejarah, dan Aplikasinya bagi Indonesia.* Airlangga University Press
3. Surya, Y. 2004. *Nanoteknologi : teknologi terkini menyambut masa depan*. Bina Sumber Daya MIPA
4. Ramsden, J. 2011. *Nanotechnology: An Introduction (Micro and Nano Technologies) 1st Edition*. William Andrew

FST6095239 Genetics Engineering

Module Name	Genetics Engineering
Module level, if applicable	Applied
Module Identification Code	FST6095239
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Dr. Dasumiati, M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome
After completing this course, students are able to explain the techniques and procedures of genetic engineering and DNA cloning, and assess their safety and bioethics in their application and products in several fields.
Module content
1. Concept and scope of genetic engineering 2. DNA isolation and purification 3. Vectors and their characteristics 4. Enzymes in genetic engineering: restriction and ligation 4. 5. Genetic engineering techniques: electrophoresis and PCR 5. 6. Genetic engineering techniques: DNA sequencing and hybridisation 7. DNA library 8. Recombinant DNA: transformation 9. Recombinant selection and expression 10. Cloning applications 11. Genetic engineering in animals and plants 12. Genetically Modified Organism (GMO) 13. Transgenic products: pros and cons and bioethics 14. Genetic engineering of plants
Recommended Literatures ● Muthiadin, C. 2014. Pengantar rekayasa genetika. Universitas Islam Negeri Alauddin Makassar. Repositori UIN Alauddin Makassar. ● Seprianto. 2017. Modul matakuliah rekayasa genetika. Universitas Esa Unggul ● Zulfiani, Juanengsih, N, Noor, MF. 2013. Bioteknologi. UIN Syarif Hidayatullah Jakarta. UIN Jakarta Press ● Brown TA. 2006. *Gene Cloning and DNA analysis an Introduction.* 4nd ed. Australia: Blackweel Publishing Asia Pty Ltd ● Old RW and Primrose SB. 2003. Prinsip – Prinsip Manipuasi Gen (terjemahan Herawati susilo). Edisi ke 4. UI press. Jakarta ● Deborah B. Whitman. 2000. "Genetically Modified Foods: Harmful or Helpful?". CSA Discovery Guides. ● 7. FG Winarno, Agustinah W. 2007. *Pengantar Bioteknologi*. MBRIO Press. ISBN 979-3098-58 Griffith, Gelbart, Lewontin, Miller. 2002. Modern Genetic Analysis 2nd Edition. Freeman Co ● International research journals and e-books published less than 10 years ago. ● Articles published in mass media

FST6095242 Ichthyology

Module Name	Ichthyology
Module level, if applicable	Applied
Module Identification Code	FST6095242
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Fahri Fahrudin, M.Si.
Language	Indonesian

Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

- Able to explain the basic concepts of ichthyology including the history of the emergence and extinction of several types of fish, the development of fisheries science and ichthyological figures
- Able to explain the concept of communication and interrelationships between systems in the fish body and the environment/habitat
- Able to describe the occurrence of diversity in fish and fish socio-ethology
- Able to identify types of fish based on various fish characteristics

Module content

1. Basic concepts of ichthyology and its scope
2. History, classification and general characteristics of fish
3. Fish morphology
4. Integumentary system and light organs
5. Fish identification techniques (meristic, morphometric, molecular)
6. Skeletal System, muscles and electrical organs
7. Circulation and respiratory systems
8. Excretory and osmoregulatory systems
9. Digestive organs and system

10. Sexual and reproductive 11. Thyroid gland, hormones and internal tissues 12. Nervous system, senses and stimulation mechanisms 13. Fish diversity 14. Socio-ethology of fish
Recommended Literatures ● Effendie, H. M. I. (2002). *Biologi perikanan*. Yogyakarta: Yayasan Pustaka Nusantara. ● Hart, P.J.B & Reynolds, J.D. 2002. *Handbook of Fish Biology and Fisheries*. Malden: Blackwell Publishing. ● Helfam, G.S, et al. 2009. *The Diversity of Fish; Biology, Evolution, and Ecology.* West Sussex: John Wiley and Sons Inc. ● Pratomo, H & Rosadi, B. 2010. *Modul identifikasi pisces*. BIOL441/Modul1. ● Priede, I.G. 2005. *Deep-Sea Fishes; Biology, Diversity, Ecology and Fisheries.* Cambridge: Cambridge University Press. ● Kottelat, M. (2013). The raffles bulletin of zoology: editorial. In *Raffles Bulletin of Zoology* (Vol. 54, Issue 2).

FST6095244 Marine Biology

Module Name	Marine Biology
Module level, if applicable	Applied
Module Identification Code	FST6095244
Semester(s) in which the module is taught	7
Person(s) responsible for the module	Prof. Dr. Lily Surayya Eka Putri, M.Env.Stud., Dr. Agus Salim, S.Ag., M.Si.
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS

Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%

Intended Learning Outcome

Students are able to explain biological concepts supported by other relevant sciences to explain problems and issues that develop and their applications. Students are able to apply biological concepts and their applications with relevant sciences. Students are able to analyse environmental problems. Students are able to master the concepts of marine biology, various ecosystems included in the coastal zone and biological principles that regulate the organization and survival of organisms and their associations, as well as understand marine biology research methodologies related to minimizing pollution in marine ecosystems.

Module content

1. Marine biology concept
2. Marine environmental problems and marine biological resources
3. Plankton, benthos and nekton biota
4. Marine plants and animals: algae, crustaceans, molluscs
5. Biogeochemical cycles and primary productivity
6. Mangrove Forest Ecosystem
7. Seagrass Ecosystem
8. Coral Reef Ecosystem
9. The impact of human activities on the sea

Recommended Literatures

1. Nybakken, J.W. 1988. Biologi Laut, suatu pendekatan ekologis (terjemahan).
2. Romimohtarto, K. 1999. Biologi Laut; Ilmu pengetahuan tentang biota laut
3. Bengen, D.G. 2000. Pengenalan dan pengelolaan ekosistem mangrove. Pusat Kajian Sumberdaya Pesisir dan Lautan IPB. 58 hal.
4. Dahuri et.al. 1996. Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan secara terpadu
5. Kadi,A dan W.S. Atmadja. 1988. Rumput Laut, Jenis, Reproduksi, produksi, budidaya dan pasca panen. Seri Sumberdaya Alam. P3OLIPI. Jakarta 71 hal.
6. Soegiarto, A., Sulistijo, W.S. Atmadja dan H. Mubarak. 1979. Rumput Laut (Alga), manfaat, potensi dan usaha budidayanya. LON-LIPI. Jakarta. 61 hal.
7. Supriyono, D. 2019. Terumbu Karang. Alprin, Semarang, Jawa Tengah.
8. Suharsono. 2008. Jenis-jenis Karang di Indonesia. Coremap Program, LIPI.
9. English, S.C. Wilkinson and V. Baker. 1994. Survey manual for tropical marine resources, Asean-Australia Marine Science Project. Australian Institute of Marine Science, Townswille. Hartog,C.Den.1970. Seagrass of the word North-Holand Publ.Co. Amsterdam.
10. Richard,H.et.al. 1983. The corals. University of Guam Press.

FST6095240 Virology

Module Name	Virology
Module level, if applicable	Applied
Module Identification Code	FST6095240
Semester(s) in which the module is taught	7
Person(s) responsible for the module	drh. Raden Rara Bhintarti Suryohastari, M.Biomed
Language	Indonesian
Relation in Curriculum	Elective course for undergraduate program in Biology
Teaching methods, Contact hours	The course topics are delivered through lectures which are enriched with relevant examples and followed by short discussion. Students are divided into ten groups of discussion. Each group was assigned to work on a specific topic relevant to the lecture and presented in the class.
Workload	● Lecture (class): (2 x 50 min) x 14 wks = 23,33 h ● Structured activities: 2 h x 14 wks = 28 h ● Independent study: 2 h x 14 wks = 28 h ● Exam: 50 min x 2 (mid test and final test) x 2 times = 3.33 h; ● Total = 82,66 h ● 82,66 / 30 = 2.755 ECTS
Credit points	2 Credit Hours (2-3) ≈ 2,755 ECTS
Admission and examination requirements	Enrolled in this course • Minimum 80% attendance in lecture
Recommended prerequisites	None
Media employed	Classical teaching tools with white board and PowerPoint presentation
Forms of assessment	Midterm exam 40%, Final exam 40%, Quiz 10%, Structured assignment 10%
Intended Learning Outcome	
After completing this course, students are able to identify viruses including properties, pathogenesis and laboratory diagnostics properly and correctly	
Module content	
● Virus structure ● The steps of virus replication ● Viral pathogenesis and disease symptoms ● Identify methods of diagnosis and treatment of viral diseases ● Prevention and control of viral diseases including vaccines ● Laboratory diagnostics	

Recommended Literatures

- Fenner, FJ. et al. 1995. Veterinary Virology. Terjemahan : Putra, D.K.H. IKIP Semarang Press, Semarang
- Murphy. FA, EPJ Gibbs, MC. Horzinek and MJ. Studdert. 1999. Veterinary Virology. 3rd Ed. Academic Press. San Diego. London. Boston. New York. Sydney, Tokyo, Toronto.
- Modrow, S and D. Falke. 1997. Molekulere Virologie. Spektrum Heidelberg-Berlin-Oxford.