ACADEMIC GUIDEBOOK

UNDERGRADUATE PROGRAM OF BIOLOGY

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

UNIVERSITAS INDONESIA

2020

1. INTRODUCTION

The Department of Biology with the Undergraduate program was one of the original Departments/Study Programs that was established with the Faculty of Mathematics and Natural Sciences (FMIPA) at Universitas Indonesia (UI). The Department started with the undergraduate program in 1961 located in Bogor. Based on location, the Department of Biology went through three locations of study: Bogor (1961-1975); Jakarta (1975-1987); and Depok (1987-present).

In the beginning, the FMIPA carried out educational activities at the Eijkman Institution building (Health Center Laboratory of the Ministry of Health) on Jalan Diponegoro 69, Jakarta. Three Departments namely Mathematics, Physics, and Chemistry were located in Jakarta while the Department of Biology was located in Bogor together with the Faculty of Veterinary Medicine and Faculty of Agriculture of Universitas Indonesia, because the educational facilities for the Biology Department in Bogor could be shared with the other Bogor based programs. At that time (1961-1968), the Biology Department was led by a Head of the Department – Dr. Soekarja Somadikarta; the founder of the Biology Department – assisted by one administrative staff, was located at the Zoology Section FKH UI, Jl. Taman Kencana Bogor. The first batch of Biology students consisted of 14 students (10 males; 4 female) in the 1961/1962 academic year.

Along with the change of organization in Universitas Indonesia where the Faculty of Agriculture and the Faculty of Veterinary Medicine became a part of Bogor Agricultural Institute (IPB) on September 1, 1963 (Decree of the Minister of Higher Education and Sciences No. 91 of 1963, 1 September 1963), the Department of Biology began to prepare for moving educational activities to Jakarta. In the 1968 academic year, the Biology Department did not accept new students at the undergraduate level in preparation for future academic activities in the Salemba campus. Starting in 1970, several of the Biology Department teaching staff were asked to take up positions in the faculty. In the period 1961-1974, the Department of Biology, FIPIA UI, produced 9 Sarjana Biologi and 20 Sarjana Muda Biologi, using the original curriculum from 1961. Starting in 1978, the Biology Department accepted first-year undergraduate students again and academic activities was held at the UI Campus in Salemba 4, Jakarta with limited facilities. During that period, preparations were being made for a bigger campus at the new Universitas Indonesia campus in Depok, a suburb area of Jakarta. After almost ten years in Jakarta, in 1987 the Department of Biology as a part of the Faculty of Mathematics and Natural Sciences moved its academic activities to the new Universitas Indonesia campus in Depok, occupying its own building with expanded teaching and research facilities.

After moving to the Depok Campus, the Department of Biology pursued establishing graduate programs in the field of Biology. The Master's degree program was established on September 25 1993 by the Decree of the Director-General of Higher Education, Ministry of Education and Culture RI No.577/DIKTI/Kep/1993 in the academic year 1993/1994. The academic year 1997/1998 saw the establishment of the Doctoral degree study program, and the program was formalized by the Decree of the Director-General of Higher Education, Ministry of Education and Culture of the Republic of Indonesia No. 256/DIKTI/Kep/1999, May 24, 1999.

The 2020 curriculum was developed referring to the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 3 of 2020, concerning National

Higher Education Standards. This curriculum is structured to adapt to the times that are currently entering the era of the Industrial Revolution 4.0. In addition, this curriculum also emphasizes Outcome-Based Education (OBE). The OBE means an educational process that focuses on achieving predetermined concrete results (results-oriented knowledge, abilities, and behavior). Students are expected to be ready to adapt and play an active role in society. The Industrial Revolution 4.0 demands new literacy that graduates need to possess, namely data literacy, technological literacy, and humanism literacy. A ministerial Regulation related to "Independent Campus" also became the basis for revisions to the previous curriculum. The "Independent Campus" program is implemented to facilitate students with the freedom to take elective courses in three semesters, namely semesters 5, 6, and 7 outside the study program (college) or courses outside the university, both inside and outside the university (overseas). In addition to the freedom to carry out learning activities outside the study program, undergraduate students also have the opportunity to continue directly to the Masters and even Doctoral levels through the Fast Track (Explanation in the Postgraduate Curriculum Book).

The 2020 is an existing in Undergraduate Program Biology. This curriculum was developed based on the Regulation of the Ministry of Education and Culture of the Republic of Indonesia No. 3 of 2020 concerning the National Standard of Higher Education (SN-DIKTI). This curriculum is structured to adapt with the current time of development that is entering the Industrial Revolution 4.0 era. Furthermore, this curriculum also emphasizes Outcome-Based Education (OBE), which means an educational process that focuses on the achievement of concrete predetermined results (knowledge that is oriented to results, ability, and behaviour), so that students are expected to be ready to adjust and can play an active role in society at that era. The Industrial revolution 4.0 demands new literacy that must be owned by graduates, namely data literacy, technology literacy, and humanism literacy. The existence of a Ministerial Regulation regarding "*Merdeka Belajar Kampus Merdeka* (MBKM-Independent Campus, Freedom to Learn)" also became the basis for revisions to the previous curriculum. MBKM is implemented with the availability of three semesters, namely the 5^{th}, 6^{th}, and 7^{th} semester for students with the freedom to take elective outside of the study program (within the university) or modules outside of the university, both at home and abroad. Other than the freedom to carry out learning activities outside of the study program, undergraduate students also have the opportunity to continue directly to the Masters and even the Doctorate levels through the Fast track path (Explanation in the Postgraduate Curriculum Book).

Revisions to the 2020 curriculum was carried out with a series of processes, including adjusting to the KKNI, SN-DIKTI, Vision and missions of the University, Faculty, Department, and Study Program, the Strategic Plan of Universitas Indonesia (Renstra UI) 2020-2024, aligning with the KOBI, reviewing the MBKM guidelines, evaluating internal and external accreditation, and benchmarking Furthermore, we have also received input from stakeholders consisting of students, lecturers, education staff, alumni and users for future curriculum improvements After the mentioned series of processes have been carried out, the team reformulated the Graduate Profile, Expected Learning Outcome, to the details of modules for each semester.

In general, the steps that were taking in the formulation of this curriculum include:

1. Formulation of the Vision and Mission of the Department of Biology 2020-2035
2. Formulation of the Vision and Mission of the Undergraduate Program of Biology 2020-2025
3. Gathering input from stakeholders (students, lecturers, education staff, alumni, and users)

4. Benchmarking graduate profile, Programme Learning Outcome, and curriculum structure
5. Reviewing inputs from accreditation results, both from national and international (ASEAN University Network) assessments
6. Alignment of curriculum revision with the Outcome-Based Education guidelines, 4.0 Industrial Revolution demands, and MBKM
7. Determination of the Graduate Profile of the Undergraduate Program of Biology FMIPA UI
8. Determination of the Programme Learning Outcome
9. Formulation of matrix 0 (KKNI equivalent) and 0A (SN DIKTI equivalent)
10. Formulation of matrix 1 Programme Learning Outcome
11. Formulation of matrix 2 and 3 (Learning Experience)
12. Formulation of the Curriculum Structure for the Undergraduate Program of Biology FMIPA UI
13. Formulation of the short description of the modules

By carrying out the various stages above, this 2020 curriculum is expected to be able to support the achievement of the Study Program Graduate Profile that is in accordance with market needs, especially when facing the 4.0 Industrial Revolution.

2. VISION AND MISSION

2.1. Department of Biology Vision

The Vision of the Department of Biology 2020-2035 is "to be the centre of excellence for higher education Tridharma (teaching, research, community service) in the fields of biodiversity, particularly in the aspect of conservation and bioprospection, which produces human resources that are capable of playing a role at the national and global levels to advance science, technology, and sustainable development".

2.2. The Mission of the Department of Biology

1. To carry out quality education, research and community dedication activities, particularly in the aspect of conservation and bioprospection of the Indonesian biodiversity.
2. To create an academic environment to produce human resources that are able to play a role and compete at the national and global levels to advance science, technology, and sustainable development,
3. To utilize domestic and foreign collaborations to support the higher education Tridharma activities.

2.3. Vision of the Study Program

To carry out excellent university Tridharma in the fields of biodiversity, particularly in the aspect of conservation and bioprospection, to produce biology graduates that is able to play a role in the national and global levels to advance science, technology, and sustainable

development."

2.4. Mission of the Study Program

1. To carry out quality education, research, and community dedication activities, particularly in the aspects of conservation and bioprospection of the Indonesian biodiversity.
2. To produce biology graduates that are able to play a role at the national and global level to advance science, technology, and sustainable development.

2.5. Undergraduate Program Objectives:

1. Organizing education (teaching) with international standards that meet the University quality standards
2. Conducting excellent research in the field of conservation and biodiversity
3. Establishing partnerships with various parties to support qualified and high competitiveness education and research.
4. To create graduates that:
    1) have professional ethics and has comprehensive knowledge in conservation and biodiversity and able to apply it effectively
    2) have the resilience to compete in the job market both at national and international levels
    3) have the independence in developing and creating new jobs for himself and others based on biological science.

2.6. Graduate Profile

"Bachelor in Biology who is able to design solutions to various problems professionally and ethically based on scientific methods using Biology concepts, especially conservation and biodiversity prospecting".

2.7. Program Learning Outcome

1) Able to apply the basic principles of mathematics, physics, chemistry, biology, and statistics in solving biological problems
2) Able to connect the principles of biology when analyzing problems, especially in aspects of biodiversity conservation and prospecting
3) Able to identify and manage biological resources and the environment based on conservation principles and biodiversity prospecting
4) Able to identify a variety of innovative entrepreneurship activities independently and ethically

5) Able to use software, basic instruments, standard methods for analysis and synthesis in general dan specific biological fields
6) Able to use spoken and written language in Indonesian and English for academic and non-academic activities
7) Have integrity, able to think critically, in a creative and innovative manner, and have an intellectual curiosity to solve problems as an individual or as part of a group
8) Able to show effort in lifelong learning
9) Able to provide alternative solutions for various problems that are present in the environment, society, and nation
10) Able to formulate solutions for biology-related problems, especially in the aspect of biodiversity conservation and prospecting, using relevant principles of biology and technology and upholding ethics and norms, and demonstrating professionalism in the field of biology
11) Able to recommend relevant principles of biology and technology in analyzing problems, especially in the aspect of conservation and prospecting of biodiversity for the benefit of the community.

3. ORGANISATION STRUCTURE

Department of Biology is directed by a Head of Department. The head of Department oversees the head of laboratory, finance and administrative staff, head of specialized area groups, and head of research groups. Meanwhile, academic quality assurance team in the Department has an equal role with the head of department. The organization structure is shown in Figure 3.1.

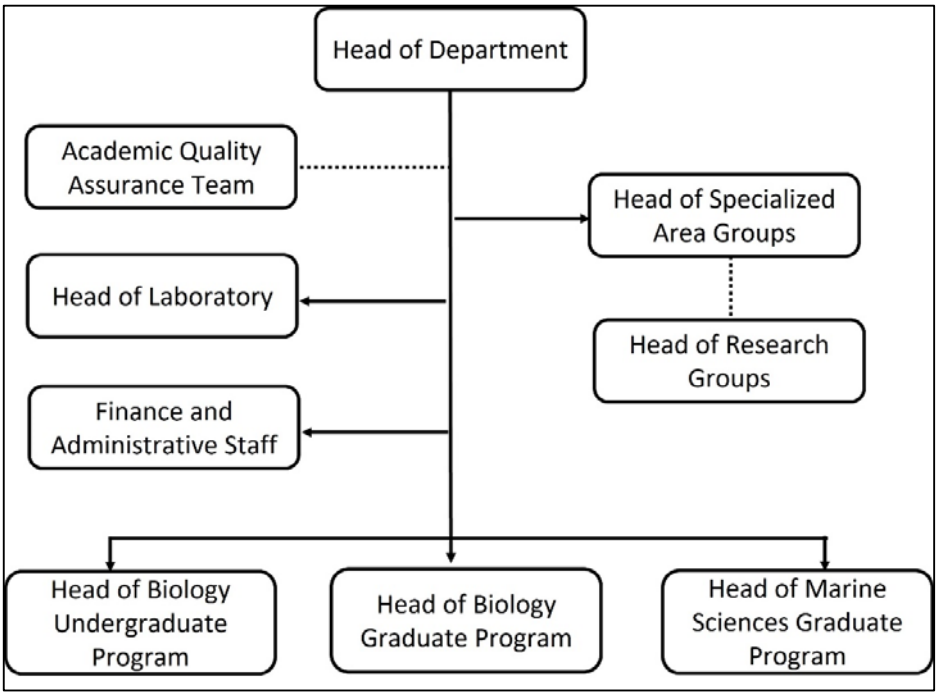

Figure 3.1. Department of Biology Organization Structure

The Department currently manages 4 study programs: The Biology Undergraduate Study Program, The Biology Post Graduate Study Program (Masters and Doctorate Degree), and the Marine Science Post Graduate Study Program. Each Study program is led by a head of study program (Table 3.1)

Table 3.1. Head of Study Program List

No	Name	Study Program	Email
1.	Dra. Andi Salamah, M.Agr., Ph.D.	Head of Biology Undergraduate Program	salamah@sci.ui.ac.id
2.	Dr. Drs. Abinawanto, M.Si.	Head of Biology Graduate Program	abinawanto.ms@ui.ac.id
3.	Dr. Dewi Susiloningtyas, S.Si., M.Si.	Head of Marine Sciences Graduate Program	dewi.susiloningtyas@sci.ui.ac.id

4. STUDY PROGRAM ADMINISTRATION

In order to support all the activities of the study programs, the Department currently has 6 full time support staff consisting of 2 lab technicians and 4 administrative staff. The list of Support staff can be seen in Table 4.1.

Table 4.1. Support Staff Contact

No.	Name	Position	Email
1	Asri Martini Wulani, S.Si.	Laboratory Staff	asrisunarda99@gmail.com
2	Susantiana	Administrative	-
3	Ida Haryati	Administrative	ida.haryati@ui.ac.id
4	Taryana	Laboratory Technician	-
5	Taryono	Administrative	-
6	Arief Fadilah	Administrative	arief.fadilah@ui.ac.id

5. NATIONAL AND REGIONAL ACREDITATION

Undergraduate Program Biology has been accredited from the national and regional scale. Based on the BAN-PT Decision No. 2723/SK/BAN.Akred/S/X/2018 for Undergraduate Program, The Undergraduate Study Program has an accreditation of A, the highest level of accreditation since October 2, 2018 – October 2, 2023. Undergraduate Program Biology also has been accredited to ASEAN University Network since December 1, 2018-November, 30 2023.

6. FACILITIES AND AMENITIES

The Department of Biology currently occupies one building, covering an area of 1,775 m^2 which consists of, 2 seminar rooms, 2 multi-function rooms, 3 teaching laboratories, 17 research laboratories, 22 staff work space, and a reading room. The seminar rooms and teaching laboratories are equipped with multimedia facilities. The reading room is located on the ground floor with a total area of 50.4 m^2. In addition, research laboratories also manage support units outside the department building: Greenhouse (160 m^2), Orchid House (24 m^2), Animal House (24 m^2). The working space for academic staff in the Department of Biology is integrated with customized laboratory space within research groups at the Department of Biology and can found in laboratories equipped for taxonomy, ecology, physiology, developmental biology, marine biology, genetics and microbiology. Each room is occupied by 2-4 lecturers. The 2nd floor of Department mainly consists of the board room, where all the administrative work is carried out and also serves as the offices for the study programs. The facilities in the E building can be seen in Table 6.1.

In addition to the laboratories in the Department, there are facilities outside the Department and also research can be carried out at other locations such as the Center of Excellence for IBR-GS (Indigenous Biological Resources-Genome Studies), Multidiscipline Laboratory at Faculty level, laboratories in other departments of MIPA UI, and the Integrated Laboratory Research Center (ILRC) which is managed by the Directorate for Research and Community Services. Presently, the laboratories with the current equipment are adequate to support teaching and research activities.

Table 6.1. The Facilities and Amenities in The Department Biology

NO	FACILITIES
1	Inverted Microscope
2	Autoclave
3	Incubator and Shaking incubator
4	Centrifuge and Microcentrifuge
5	CO_2 Incubator
6	PCR
7	Electrophoresis Apparatus
8	Sonicator
9	Fermenter
10	Vacuum Rotary Evaporator
11	Microtome
12	Tissue Culture Hood
13	Growth Chamber
14	Oven
15	Immunoelectrophoretic Apparatus
16	Analytical Balance
17	UV-VIS-NIR Recording Spectrophotometer
18	HPLC Diode Array automatic injection
19	Biosafety Cabinet
Amenities	
1	Greenhouse
2	Orchid House

3	Butterfly House
4	Rodentia Maintenance House
5	CoE Indigenous Biological Resources-Genomic Studies Laboratory
6	Collaboration laboratory
7	Other Research and Teaching Laboratories
Research Station:	
1	Javan Gibbon Centre Bodogol, Gunung Gede Pangrango National Park
2	Schmutzer Primate Center, Ragunan Zoo, Jakarta
3	Legok Heulang, Gununng Halimun National Park
4	Natai Lengkuas, Tanjung Putting National Park
5	Puncak Beringin, Central Sulawesi
6	Suaq Balimbing, Ketambe Aceh
Collection	
1	Herbarium collection (Herbarium Dep)
2	Animal collection
3	Microorganism (Univ. of Indonesia Culture Collection/UICC)
4	Reading collections (text books, journal, research reports, etc.)

7. ACADEMIC STAFF LIST

The Department of Biology employs 35 full time academic staff: 22 are PhDs (62.9%), 4 are PhD candidates (11.4%), 2 are currently enrolled as PhD students (5.7%), while the rest are still encouraged to get PhD position soon (20.0%). The competencies of each staff vary, and they are grouped according to their research interests. There are 5 research group in Department of Biology, i.e. CEMBIOS, CEEB, WILD, MECE, and MSP. The description of each research group can be found in the chapter 9. The staff then are grouped into three specialized interest groups related to botany, zoology and microbiology (Table 7.1).

Table 7.1 Academic Staff List

No.	Name	Email	Research Group	Specialized Area Group
1	Dr. Drs. Abinawanto, M.Si.	abinawanto.ms@ui.ac.id	CEMBIOS	Zoology
2	Drs. Adi Basukriadi, M.Sc., Ph.D.	basukriadi@sci.ui.ac.id	CEEB	Zoology
3	Afiatry Putrika, S.Si., M.Si.	a.putrika@sci.ui.ac.id	WILD	Botany
4	Andi Eko Maryanto, S.Si., M.Si.	andi.maryanto@ui.ac.id	WILD	Zoology
5	Dra. Andi Salamah, M.Agr., Ph.D.	salamah@sci.ui.ac.id	CEMBIOS	Botany
6	Anom Bowolaksono, S.Si., M.Sc., Ph.D	alaksono@sci.ui.ac.id	CEMBIOS	Zoology
7	Dra. Ariyanti Oetari, M.Phil., Ph.D.	a-oetari@sci.ui.ac.id	MSP	Microbiology
8	Astari Dwiranti, S.Si., M.Eng., Ph.D.	astari.dwiranti@sci.ui.ac.id	CEMBIOS	Zoology
9	Dr. Dian Hendrayanti, S.Si., M.Sc.	dian.hendrayanti@sci.ui.ac.id	MSP	Microbiology
10	Dimas Haryo Pradana, S.Si., M.Si.	d.h.pradana@ui.ac.id	CEEB	Zoology
11	Drs. Erwin Nurdin, M.Si.	erwinn@ui.ac.id	CEEB	Zoology
12	Fadhillah, S.Si., M. Agr., Ph.D.	fadhillah@sci.ui.ac.id	CEMBIOS	Zoology
13	Fitrianingsih, S.Si., M.Eng.	fitria_ningsih@sci.ui.ac.id	MSP	Microbiology
14	Drs. Iman Santoso, M.Phil.	iman-s@ui.ac.id	MSP	Microbiology
15	Prof. Dr. Drs. Jatna Supriatna, M.Sc.	jsupriatna@sci.ui.ac.id	WILD	Zoology

16	Dr. Dra. Luthfiralda Sjahfirdi, M.Biomed.	luthfiralda@sci.ui.ac.id	WILD	Zoology
17	Mega Atria, S.Si., M.Si.	mega.atria@sci.ui.ac.id	WILD	Botany
18	Dr. rer. nat. Mufti Petala Patria, M.Sc.	mpatria@ui.ac.id	CEEB	Zoology
19	Niarsi Merry Hemelda, S.Si., M.Si.	merry.hemelda@sci.ui.ac.id	MeCE	Botany
20	Dr. Dra. Nining Betawati Prihantini, M.Sc.	nining@sci.ui.ac.id	MSP	Microbiology
21	Dr. Dra. Nisyawati, M.S.	nisyawati@sci.ui.ac.id	WILD	Botany
22	Nova Anita, S.Si., M.Biomed.	nova.anita@ui.ac.id	CEMBIOS	Zoology
23	Dr. Dra. Noverita Dian Takarina, M.Sc.	noverita.dian@sci.ui.ac.id	CEEB	Zoology
24	Dr. Dra. Noviar Andayani, M.Sc.	andayani@ui.ac.id	WILD	Zoology
25	Dr. Dra. Ratna Yuniarti, M.Si.	ratnayuniati@sci.ui.ac.id	MeCE	Botany
26	Dr. Retno Lestari, S.Si., M.Si.	retno.lestari@ui.ac.id	CEMBIOS	Botany
27	Riani Widiarti, S.Si., M.Si.	rianiwid@sci.ui.ac.id	CEEB	Zoology
28	Saifudin, S.Si., M.Si	saifudin@sci.ui.ac.id	CEMBIOS	Botany
29	Dra. Sitaresmi, M.Sc.	sitares@ui.ac.id	MSP	Microbiology
30	Dr. Upi Chairun Nisa, S.Si., M.Sc.	upi.nisa@sci.ui.ac.id	MeCE	Zoology
31	Dra. Wellyzar Sjamsuridzal, M.Sc., Ph.D.	sjwell@ui.ac.id	MSP	Microbiology
32	Prof. Dr. Drs. Wibowo Mangunwardoyo, M.Sc.	wibowo.mangun@ui.ac.id	MSP	Microbiology
33	Windri Handayani, S.Si., M.Si.	windri.h@sci.ui.ac.id	MeCE	Botany
34	Drs. Wisnu Wardhana, M.Si.	wisnu@sci.ui.ac.id	CEEB	Zoology
35	Dr. rer. nat. Yasman, S.Si., M.Si.	yasman.si@sci.ui.ac.id	MeCE	Zoology

8. CURRICULUM AND PROGRAM STRUCTURE

The current curriculum of UPBio (2020) is constructed to align with the PLOs and designed to enable students to complete all modules (min. 144 credits), and obtained skills and competency as biologists in 8 semesters (4 years). The maximum time for completing the studies is 12 semesters (6 years). The modules consist of compulsory (100 credits) and elective (44-60 credits) modules. The structure of the UPBio curriculum is depicted in Figure 8.1. According to Figure 8.1, it is shown that the individual modules are designed to contribute to the achievement of the PLOs and they are also interconnected.

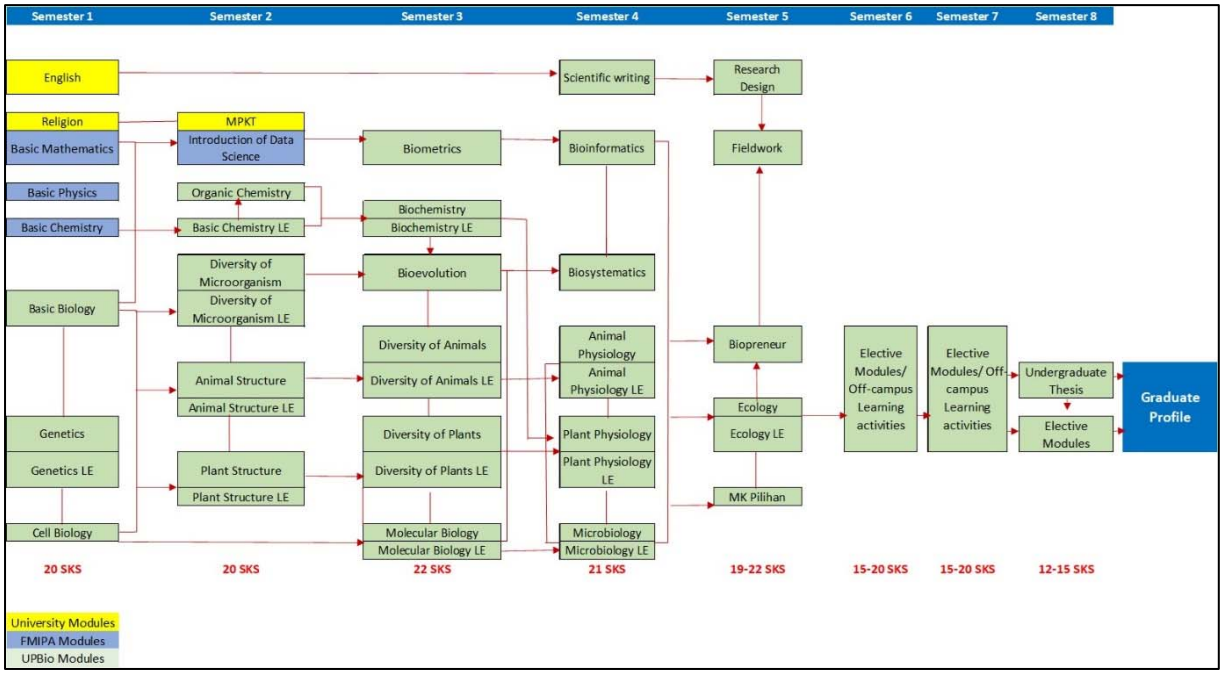

Figure 8.1 The UPBio Curriculum Structure

The 2020 curriculum implement the MBKM policy with the availability of three semesters, namely the 5th, 6th, and 7th semester for students with the freedom to take elective modules outside of the study program (within the university) or modules outside of the university, both at home country and abroad. Other than that, the freedom to carry out learning activities outside of the study program is also facilitated in MBKM. The learning activities include an internship in the industry, a project in the village, student exchange, research, entrepreneurship, etc. Furthermore, the undergraduate students also have the opportunity to continue directly to the Masters and even the Doctorate levels through the Fast track path.

Modules in the 2020 curriculum consists of compulsory and elective modules with details of each semester as follows:

Tabel 8.1. Modules Composition for the Undergraduate Program of Biology 2020 Curriculum

No	Semester	Code	Module Name	Credit	Status
Semester 1					
1	1	UIGE600003	English	2	MKU
2	1	UIGE600004	Religion	2	MKU
3	1	SCMF600001	Basic Mathematics	2	MKWF
4	1	SCPH601110	Basic Physics	2	MKWF
5	1	SCCH601101	Basic Chemistry	2	MKWF
6	1	SCBI601103	Basic Biology	3	MKP
7	1	SCBI601101	Genetics	3	MKP
8	1	SCBI601102	Genetics Practical	1	MKP
9	1	SCBI601001	Cell Biology	3	MKP
			Total	**20**	
Semester 2					
1	2	UIGE600006	Integrated MPK	5	MKU
2	2	SCMF600002	Introduction to Data Science	2	MKWF
3	2	SCCH601191	Basic Chemistry Learning Experience	1	MKP
4	2	SCBI601201	Animal Structure	2	MKP
5	2	SCBI601331	Animal Structure Learning Experience	1	MKP
6	2	SCBI601202	Plant Structure	2	MKP

7	2	SCBI601329	Plant Structure Learning Experience	1	MKP
8	2	SCBI602205	Microorganism Diversity	3	MKP
9	2	SCBI602227	Microorganism Diversity Learning Experience	1	MKP
10	2	SCCH602591	Organic Chemistry	2	MKP
			Total	**20**	
Semester 3					
1	3	SCBI603201	Evolution Biology	3	MKP
2	3	SCBI602003	Biometrics	3	MKP
3	3	SCBI602206	Plant Diversity	3	MKP
4	3	SCBI602207	Plant Diversity Learning Experience	1	MKP
5	3	SCBI602203	Animal Diversity	3	MKP
6	3	SCBI602204	Animal Diversity Learning Experience	1	MKP
7	3	SCCH602691	Biochemistry	3	MKP
8	3	SCCH603691	Biochemistry Learning Experience	1	MKP
9	3	SCBI603009	Molecular Biology	3	MKP
10	3	SCBI603010	Molecular Biology Learning Experience	1	MKP
			Total	**22**	
Semester 4					
1	4	SCBI602332	Plant Physiology	3	MKP
2	4	SCBI602334	Plant Physiology Learning Experience	1	MKP
3	4	SCBI602335	Animal Physiology	3	MKP
4	4	SCBI602336	Animal Physiology Learning Experience	1	MKP
5	4	SCBI603401	Microbiology	3	MKP
6	4	SCBI603402	Microbiology Learning Experimence	1	MKP
7	4	SCBI603011	Scientific Writing	3	MKP
8	4	SCBI602202	Biosystematics	3	MKP

9	4	SCBI602228	Bioinformatics	3	MKP
			Total	**21**	
Semester 5					
1	5	SCBI603005	Research Design	3	MKP
2	5	SCBI603004	Practical Work	2	MKP
3	5	SCBI602501	Ecology	3	MKP
4	5	SCBI602502	Ecology Practical	1	MKP
5	5	SCBI603101	Biopreneur	2	MKP
6	5		Elective Modules*	8	MKP
			Total	**19**	
Semester 6					
1	6		Elective modules within the study program/outside the study program/outside the university*	15	MKP
			Total	**15**	
Semester 7					
1	7		Elective modules within the study program/outside the study program/outside the university*	15	MKP
			Total	**15**	
Semester 8					
1	8		Undergraduate thesis	6	MKP
2	8		Elective modules within the study program/outside the study program/outside the university*	6	MKP
			Total	**12**	
			***Grand* Total**	**144**	

Table 8.2. Internal elective module of UPBio

No	Modules	Credit	Research group**
1	Entomology	2	CEEB
2	Marine Biology	3	CEEB
3	Planktonology	2	CEEB
4	Marine Life Physiology	2	CEEB
5	Animal Ecology	3	CEEB
6	Freshwater Ecology	2	CEEB
7	Oceanography	2	CEEB
8	Endocrinology	2	CEMBIOS
9	Applied Genetics	3	CEMBIOS
10	Immunology	2	CEMBIOS
11	Histology	2	CEMBIOS
12	Cytogenetics*	2	CEMBIOS
13	Introduction to Animal Cell Culture*	2	CEMBIOS
14	Plant In Vitro Culture	2	MeCE
15	Introduction to Omics Science*	3	MeCE
16	Chemical and Functional Ecology*	3	MeCE
17	Introduction to Natural Material*	3	MeCE
18	Plant Conservation and Cultivation*	3	MeCE
19	Bioremediation*	2	MeCE
20	Mycology	2	MSP
21	Food Microbiology	2	MSP
22	Macroorganism Bioprospection*	2	MSP
23	Microorganism Bioinformatics and Systematics*	3	MSP
24	Bacteriology*	2	MSP
25	Algae Culture Technology*	3	MSP

26	Environmental Microbiology	2	MSP
27	Microorganism Prospection and Fermentation*	2	MSP
28	Biogeography	2	WILD
29	Animal Behaviour Science	2	WILD
30	Conservation Genetics	2	WILD
31	Landscape Ecology	3	WILD
32	Ethnobiology*	3	WILD
33	Conservation Biology*	2	WILD
34	Wildlife spatial technology*	2	WILD
35	Natural resource management	2	Other [All]
36	Bio-risk Bioethics and Biosafety*	2	Other [All]
37	Science Communication*	2	Other [All]
38	Capita Selecta Biodiversity Conservation and Prospection*	3	Other [All]
	Total	88	

Explanation: Elective modules are provided on odd, even, or odd-even semesters

9. RESEARCH GROUP

Since 2019, there are only 5 Research Groups in the Department of Biology FMIPA that no longer affiliated to a certain KBI. The five Research Groups are:

1. Community Ecology and Environmental Biology (CEEB)
2. Cellular and Molecular Mechanisms in Biological System (CEMBIOS)
3. Metabolomics and Chemical Ecology (MeCE)
4. Microbial Systematics and Prospecting (MSP)
5. Wildlife Biology and Sustainable Landscape (WILD)

Each Research Group is led by the Head of Research Group who is a lecturer with the functional position of Associate Professor or Professor. Each Research Group has a member lecturer who conducts research activities in accordance with the scope and roadmaps of their respective Research Groups.

1. Cellular and Molecular Mechanisms in Biological System (CEMBIOS)

The focus of CeMBioS research group is to study the cellular, molecular, and genomic mechanisms which occur in the cells as an individual, as well as the building block of an organism including to the structure and function of the process underlying a biological system.

Point of Interest

1. Conducting basic research in the biological system.
2. Understanding major biological processes at the cellular and molecular level, through the application of methods drawn from structure, function, and genetics.
3. Supporting advanced research within the cellular, molecular, and genomic area in the field of biodiversity conservation and prospection.

Aims

Our goals are to develop high-quality research, to train graduate students in cellular and molecular research, and to strengthen undergraduate education in the area of cellular, molecular and genomic mechanism.

1) To train graduate students and to strengthen undergraduate education in the area of cellular, molecular, and genomic mechanism
2) To answer cellular and molecular phenomenon that occurs in nature primarily which is related to Indonesian biodiversity
3) To explore the opportunities to connect to a global research atmosphere to accelerate research and preparing Indonesian global research leader in the future.

Field of Study

1) The basic cellular and molecular mechanisms
2) The complexity of cellular life using experimental methods that span the genome to the phenotype
3) Immunology, apoptosis, autophagy mechanism and pathway
4) Structure and dynamics of biological macromolecules i.e. chromosome biology
5) Genetic engineering
6) Cell banking
7) Cell and ultrastructure imaging

2. Community Ecology and Environmental Biology (CEEB)

The Community Ecology focuses on functional interactions between communities of plants (producers), herbivores (primary consumers), predators (secondary consumers), and soil biota (decomposers) with regard to critical ecosystem services such as productivity, protection, nutrient cycling and storage.

The Environmental Biology studies on the effects of natural and anthropogenic environmental change on plants, animals, their populations and ecosystems. Understanding mechanisms of action and physiological/behavioural adaptations to environmental stressors is vital to predicting impacts on populations

3. Metabolomics and Chemical Ecology (MECE)

Research Group of Metabolomics and Chemical Ecology (MeCE) focuses on studying metabolites diversity in organisms related to their biotic and abiotic factors, their function for interaction among organisms (intra and inter specific interaction), as well as their benefit for human welfare.

Research Focus:

1) Metabolomics in animals, plants, and microbes collected from Indonesia
2) Marine and Terrestrial Chemical Ecology of organisms in Indonesia
3) Applied research related to Metabolomics and Chemical Ecology

Aims:

To develop high-quality research, supervise graduate and undergraduate students, as well as build networking for local and global research collaboration in the area of Metabolomics and Chemical Ecology; To apply Metabolomics and Chemical Ecology for the society advantages.

Field of study:

1) Metabolomics
2) Chemical Ecology
3) Ecophysiology
4) Natural Products
5) Bioprospecting
6) Biochemistry and Biophysics

Microbial Systematics and Prospecting (MSP)

This research group has a strong emphasis on molecular systematics; ecology of prokaryote and eukaryotic microorganisms; the study of the fundamental properties of Bacteria, Archaea, Fungi and their interaction with hosts and environment. The group also focus on the development of potential prokaryote and eukaryotic microorganisms for environment, agriculture, food, health, and industries.

Research Interests:

1) Study on microbial diversity based on culture-dependent and culture-independent methods, traditional taxonomy, polyphasic taxonomy approaches, phylogenetic and phylogenomic analyses, whole genome sequence analysis.

2) Study on microbial morphology, physiology, biochemistry, photosynthesis, ecology, and evolution; host-microbes interaction, and bioinformatics.
3) Screening of potential indigenous microbial resources as producers of enzymes, antibiotics, and bioactive compounds; as bio-control agents, bioremediation agents, and feed.
4) Purification and characterizations of antibiotics, bioactive compounds, and enzymes.
5) Optimization of the production of bioactive compounds in small-scale and genome mining.

Goals And Objectives:

1) Provide knowledge platforms to promote the utilization of scientifically interesting and industrially useful biological resources originated from Indonesia, especially microorganisms.
2) Ex-situ conservation of indigenous microbial resources.

WILD (Wildlife Biology and Sustainable Landscape)

This group is aimed to direct our collective expertise, experiences, and interest to support the Government's commitment to SDGs, particularly Goals 13, 14, and 15. We believe that understanding the biology of wild flora and fauna in a changing landscape and seascape is crucial to ensure that development activities do not surpass nature's carrying and restoring capacity

Research Focus:

1) Conservation genetics of critically endangered mammals in fragmented landscapes of Sumatra and Java
2) Metagenomics studies to detect positive selection under different landscape management systems.
3) Assessments of landscapes' carrying capacity using various parameters in relation to human – wildlife conflict, wildlife ecosystem, and sustainable development.
4) Resilience of lifeforms, including invasive species, and emerging diseases in the process of urbanization and climate change.
5) Behaviour interaction in endangered large mammals.
6) Urban exotic and invasive species
7) Biodiversity and ecosystem services
8) Life cycle assessment

Aims:

For the next 20 years, we will build and strengthen our research interest and capacity on wildlife biology and sustainable landscape to meet the following objectives:

1) Saving endangered and endemic wildlife

2) Providing science-based recommendations to design and manage human-wildlife interphase in biodiversity rich landscapes.
3) Developing climate resilience management tools to conserve wildlife.
4) Understanding the landscape dynamics for the preservation of wildlife and sustainable development
5) Finding the correlation from genes to ecosystem and adaptation to support resilience.
6) Digital technology on conservation & predicting biodiversity trend.
7) Bioprospecting and ecosystem services
8) Building a Digital collection for urban wildlife diversity.

Field of studies:

1) Biodiversity and ecosystem services study for terrestrial and marine wildlife in Indonesia.
2) Landscape genomics.
3) Conservation genetics for big mammals' conservation in Indonesia
4) Urban exotic and invasive species
5) Sustainable landscapes
6) Climate change adaptation and mitigation.