CURRICULUM OVERVIEW

Master in Biotechnology

Master's Program of Biotechnology
Postgraduate
UNIVERSITAS JEMBER

Homepage: https://bioteknologi.pasca.unej.ac.id

2021

CURRICULUM OVERVIEW

MASTER IN BIOTECHNOLOGY

POSTGRADUATE
UNIVERSITAS JEMBER
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Master in Biotechnology

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Study program : Master in Biotechnology
Faculty : Postgraduate

UNIVERSITAS JEMBER, 2021

FOREWORD

Praise be to Allah SWT, Curriculum committee can finish the Outcome Based Curriculum after going through a fairly long process. This document is prepared as a guide for lecturers and students of the Master in Biotechnology - Universitas Jember in developing effective, efficient, and quality learning programs.

The curriculum compiled is an effort of postgraduate program of Master in Biotechnology in order to prepare graduates who are superior and have a minimum competency of a master of biotechnology who are ready to enter the global world. The curriculum described in this document was developed through several stages, including tracer studies, discussions with stakeholders (FGD), benchmarking, and inviting curriculum experts. Furthermore, the curriculum team for Master in Biotechnology completes the curriculum document by considering input from various parties. This document generally describes the profile of the study program, graduate learning outcomes, distribution and description of the study program.

We express our deepest gratitude to all those who have helped a lot during the completion of this curriculum document. Criticisms and suggestions for improving the curriculum document are highly expected. Finally, we do really hope that this curriculum document can be used as a learning guide and it can contribute to the development of science in general and improve the quality of graduates.

Jember, October 2021
Curriculum Committee

PROGRAMME SPESIFICATION

Institution/University	:	Universitas Jember
Faculty	:	Postgraduate
Study Program	:	Master in Biotechnology
Address	:	Jl. Kalimantan 37 Jember- - Jawa Timur 68121
Contact	:	Phone/Fax : +62331-344988
Date of establishment	:	November 18th 2015
Accreditation	:	**B** by BAN PT No. 1812/SK/BAN-PT/Akred/M/V/2019, (National)
Name of Final Award	:	Master of Biotechnology
Admission criteria or requirements to the program	:	1. Bachelor in Biotechnology, Biology, Agriculture, Biology Education, Chemistry, Chemistry Education, Medical, and Pharmacy 2. Passed the student enrollment test
Model of Study	:	Full-time
Total of credits	:	39 credits (58,89 ECTS)
Language of Study	:	Indonesian and/or combined with English
Duration	:	2 years (4 semester, 2 semester/year)
Website	:	http://pasca.unej.ac.id/bioteknologi/
Lecturer: students	:	1: 1.6

1. Fundamental of Curriculum

1.1 University's Value

The university's value as the basis for curriculum development is sesanti Karya Rinaras Ambuka Budhi, Gapura Mangesthi Aruming Bawana (a more detailed explanation on the philosophical basis). In addition, in order to provide direction to continuously improve inputs, processes, and outputs, Universitas Jember (UNEJ) has formulated an academic quality policy. The essence of the academic quality policy is that UNEJ will always prioritize quality, so that it will lead to success for the academic community in it in accordance with the UNEJ motto enlighten your future.

1.2 Fundamental of Philosophical

The philosophical foundation of curriculum preparation is based on the Undang-Undang Dasar 1945 and Pancasila as the state fundamental of Indonesia. The implementation of education is based on the noble ideals by the founders of "Karya Rinaras Ambuka Budi Gapura Mangesti Aruming Bawana", which means:

a) Rinaras Ambuka Budhi's work is UNEJ's determination to organize itself through harmonious, conformable and balanced work based on faith and piety to accept the development of science and technology.
b) Gapura Mangesthi Aruming Bawana is the target of UNEJ's performance to produce graduates who are sujana as whole human beings whose service in society always brings the fragrance of the nation and state, prosperity, welfare, and peace of mankind.

1.3 Fundamental of Historical

In 2015, the Postgraduate in UNEJ was entrusted with the Decree of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 103/KPT/I/2015 to manage the Master in Biotechnology. Master in Biotechnology has a scope of fields of science including agricultural and health biotechnology. The two fields are contained in the interest in developing the field of science. In the implementation of the teaching and learning process and the development of science, the Master in Biotechnology is strengthened by the formation of a research group based on three interests and laboratory facilities at the Center for Development of Advanced Sciences and Technology (CDAST). Master in Biotechnology as a multidisciplinary study program requires a curriculum that is able to accommodate it. The implementation of the previous curriculum, namely the research-based KKNI (RBL) in 2015-2019, but along with the development of Industry 4.0 which was

followed by the education sector into Education 4.0, it demanded a curriculum reformulation based on outcomes (outcome-based education / OBE).

1.4 Fundamental of Law

a) Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers (State Gazette of the Republic of Indonesia of 2005 Number 157, Supplement to the State Gazette of the Republic of Indonesia Number 4586);
b) Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education (State Gazette of the Republic of Indonesia of 2012 Number 158, Supplement to the State Gazette of the Republic of Indonesia Number 5336);
c) Regulation of the President of the Republic of Indonesia Number 8 of 2012, concerning the Indonesian National Qualifications Framework (KKNI);
b) Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 73 of 2013, concerning the Implementation of the KKNI in the Higher Education Sector;
c) Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 44 of 2015, concerning National Standards for Higher Education;
d) Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 81 of 2014, concerning Diplomas, Certificates of Competence, and Professional Certificates of Higher Education;
e) Regulation of the Minister of Research, Technology, and Higher Education of the Republic of Indonesia Number 32 of 2016, concerning Accreditation of Study Programs and Universities;
f) Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 62 of 2016 concerning the Higher Education Quality Assurance System;
g) Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 55 of 2017 concerning Teacher Education Standards;
h) Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 3 of 2020 concerning National Standards for Higher Education;
i) Rector's Decree No. 10902/UN25/KP/2013 regarding guidelines for curriculum preparation in Universitas Jember;
j) Rector's Decree No. 17527/UN25/KP/2017 regarding guidelines for curriculum preparation in Universitas Jember;
k) Rector's Decree No. 12609/UN25/KP/2018 concerning Guidelines for Planning, Implementation, and Assessment of Learning in Universitas Jember.
l) Rector's Regulation No. 13532/UN25/EP/2020 concerning Independent Learning in Universitas Jember.

2. Vision and Program Objectives (POs)

2.1 Vision, Mission and PO of Postgraduate

A. Vision

Becoming a postgraduate institution that is qualified, environmentally friendly and able to develop science, technology and/or art for the benefit of mankind, especially in supporting the development of the agricultural industry.

B. Mission

1) Implement, coordinate and develop quality postgraduate education and ecotechnopreneurship insight,
2) To develop postgraduate education based on science, technology, and art that is innovative, environmentally friendly, business, and the agricultural industry for the welfare of the community,
3) Empowerment of agribusiness communities by applying appropriate technology based on local wisdom,
4) Develop an accountable and international standard postgraduate program management system,
5) Develop a network of cooperation with stakeholders and other institutions at home and abroad.

C. Program Objectives (POs)

1) Produce graduates who are intellectual, competitive and comparative in the Southeast Asian region;
2) Produce superior works of science, technology and art that have economic value, are environmentally friendly, local wisdom and contribute to the people of the Southeast Asian region.
3) The existence of an excellent work culture by strengthening the implementation of a quality management system based on information and communication technology (ICT) that is accountable, effective and efficient.

2.2 Vision, Mission and PO of Master in Biotechnology

A. Vision

Becoming a leading and excellent Master of Biotechnology in agricultural and health biotechnology recognized nationally and internationally with the orientation to the development of agroindustry that is beneficial for academics, society and the working world.

B. Mission

1) Organize the management of the Master in Biotechnology of agriculture and health fields professionally and accountability.
2) Organize a flexible international standard Master in Biotechnology of agriculture and health fields in accordance with the development of science and technology.

3) Develop basic or applied research oriented to the growth of agro-industrial biotechnology through exploration, modelling and biological engineering.

C. Program Objectives (POs)

1. Having characters, quality, and biotechnological competencies with agroindustry-minded;
2. Able to produce qualified research products in the form of scientific publications, patents, or commercial products and benefit the public interest;
3. Able to develop collaborations in education and research at the national and international levels.

3. Curriculum Evaluation and Tracer Study

3.1 Curriculum Evaluation

The curriculum review is carried out after one cycle of curriculum implementation is indicated by the presence of graduates who use the curriculum. In 2019, Master in Biotechnology already had alumnus, where the evaluation of the length of study showed an average duration of 2 years and 11 months. The evaluation results of learning process up to the 2019/2020 school year showed that the aspects of material updating (assignments, papers, etc.) and giving feedback were need to be improved. In addition, there are several important regulations related to the implementation of higher education curriculum, and it made a necessity for evaluation of Master in Biotechnology curriculum 2016. The new regulations include Permenristekdikti Number 44 of 2015 concerning SN-Dikti, KPT 2016, and Guidelines for Preparation of Higher Education Curriculum in the Industrial Era 4.0 to Support Independent Campuses Independent Learning (KPT 2020).

SN-Dikti which was formed by the government through Permenristekdikti Number 44 of 2015, has strictly regulated the principles and elements of the curriculum that must be accommodated. Graduate competency standards, content standards, and process standards are some of the contents of SN-Dikti that must be accommodated in the preparation of the study program curriculum. KPT 2016 in detail describes the stages of curriculum preparation, which are generally divided into 3 stages, namely: curriculum design, learning, and evaluation of learning programs. KPT 2016 is equipped with examples of RPS (Semester Learning Plans), syllabus, lecture contracts, assessment rubrics, and student assignment plans. KPT 2016 emphasizes the importance of compiling and assessing Program Learning Outcomes. In 2018, the guidelines for compiling KPT 2016 were then refined by the Directorate for BELMAWA based on the results of curriculum evaluation implementation in various universities during technical guidance and socialization of curriculum preparation referring to SN-DIKTI and input from various parties. In KPT 2018, elements related to the Industrial Era 4.0 are included with the aim that university graduates are ready to face and have the opportunity to solve the challenges of increasingly complex life in the 21st century, especially competition in the ASEAN Community Economic (MEA) era.

Based on above description, the improvement of Master in Biotechnology curriculum is carried out towards the development of a systemic and comprehensive curriculum that includes national programs, universities, faculties, and study programs with the correct stages. Completion of curriculum 2016 for Master in Biotechnology study program is not

only concerned with converting competencies into graduate learning outcomes (PLO), but also the mechanism for determining courses, formulating course learning outcomes, preparing Semester Learning Plans (RPS), setting the curriculum structure for each subject. lesson. semester, and reviewing the vision and mission of the study program, as well as changing the formulation of graduate profiles and their descriptions.

3.2 Tracer Study

The results of a tracer study conducted in 2020 on 30 alumni of Master in Biotechnology showed that 30% of alumni who worked as researchers and worked in the private sector, 16.67% of lecturers, 10% of teachers, 10% of others job; and 3.33% person was unemployed (Figure 1).

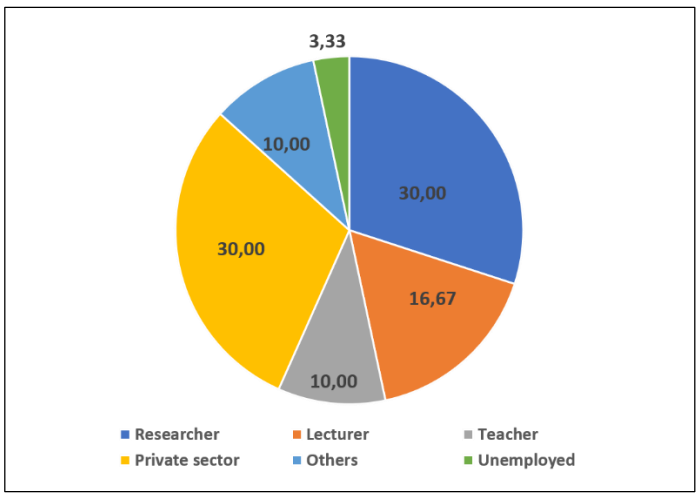
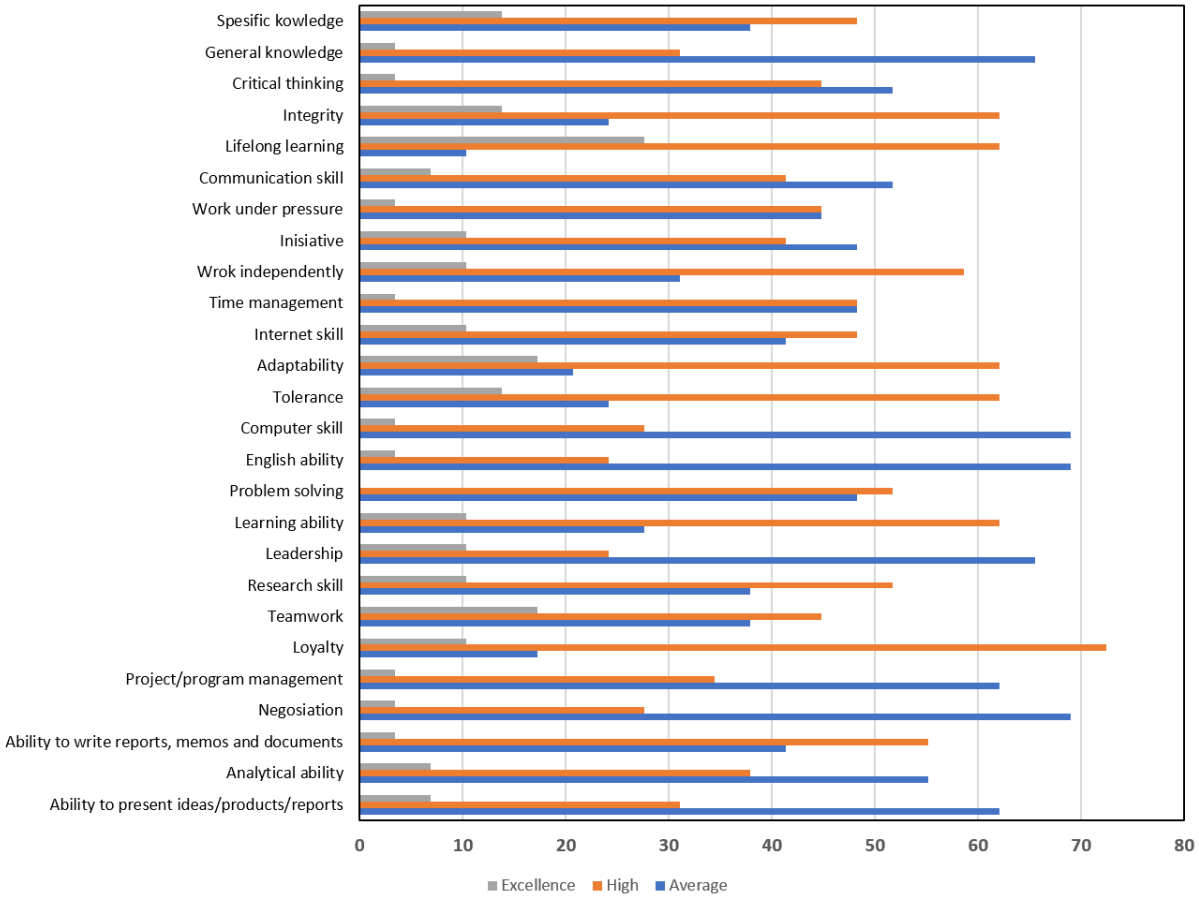


Figure 1. Job profile of alumnus of Master in Biotechnology

Regarding the competence of graduates, the survey results showed that the alumnus of Master in Biotechnology have fairly good competencies, but still need a lot of improvement, especially in English language skills, computer skills and negotiation (Figure 2).



4. Graduate Profiles and Program Learning Outcomes (PLOs)

4.1 Graduate Profiles (GPs)

Table 1. Graduate Profiles and Descriptions

No	Graduate Profile	Description
1	Biotechnology Educator	Educators who can develop biotechnology through research, and transfer it to students.
2	Researcher	Researchers who can manage and develop comprehensive research to solve biotechnological problems and to produce output that benefits society.
3	Biotechnology Entrepreneur	Entrepreneurs who can apply biotechnology principles to manage biological resources with agroindustry environmental insight.

4.2 Program Learning Outcomes (PLOs)

The preparation of the PLOs of Master in Biotechnology at the University of Jember is adjusted to the Indonesian National Qualifications Framework (KKNI) Level 8, namely:

1. Able to develop sciences, technology, and/or art within the fields or professional practices through research, to produce innovative and proven work;
2. Able to solve the problems in sciences, technology, and/or art within the fields fields through interdisciplinary and multidisciplinary approaches;
3. Able to manage research and development that benefits society and knowledge, also to get recognition, nationally and internationally.

Formulation of PLOs of Master of Biotechnology is referring to National Standard of Higher Education and Subject-Specific Criteria of the Technical Committee (SSC) 10-ASIIN. Accordingly, every graduate of Master of Biotechnology achieved the learning outcomes as listed below (Table 2).

Table 3. PLOs and Indicators

No	PLOs	Code	Indicators
Attitude			
PLO1	Able to **internalize** an attitude of piety to God Almighty and love their country	1A	**Showing** responsibility, honesty, and discipline as the manifestation of piety to God Almighty
		1B	**Showing** a caring attitude towards the preservation of Indonesian culture and biodiversity as the embodiment of an attitude of loving the country.
Knowledge			
PLO2	Able to **develop** the biotechnological principles and other relevant sciences	2A	**Analysing** principles of biotechnology and other sciences related to the agroindustrial problems
		2B	**Evaluating** principles of biotechnology and other relevant sciences for solving the agroindustrial problems
General Skills			
PLO3	Able to **demonstrate** the ability to collaborate and to communicate well in verbal and in writing national and/or internationally	3A	**Showing** collaborative skill during the learning process
		3B	**Demonstrating** communication skills both in verbal and in writing nationally and/or internationally
Specific Skills			
PLO4	Able to **modify** skills and knowledge of DNA and	4A	**Applying** the skills and knowledge of DNA and protein-based biotechnology

No	PLOs	Code	Indicators
	protein-based biotechnology to produce innovative and useful biological products for agroindustrial sectors	4B	**Evaluating** innovative and useful biological products for agroindustrial sectors
		4C	**Producing** innovative and useful biological products for agroindustrial sectors
PLO5	Able to **manage** biotechnology research comprehensively with a multidisciplinary approach to solve problems in agroindustrial sectors.	5A	**Analyzing** the agroindustrial problems
		5B	**Applying** biotechnological methods through a multidisciplinary approach to solve agroindustrial problems
		5C	**Conducting** advanced research to solve agroindustrial problems
		5D	**Determining** solutions for agroindustrial problems

4.3 Correlation between PLOs and SSC-10 ASIIN

Table 3. Correlation of Master of Biotechnology PLOs and SSC-10

No	ASIIN Requirements for Master's degree Programs in Life Sciences	PLOs				
		1	2	3	4	5
Subject-Specific Competences						
1	have advanced their knowledge in core subjects, subject-relevant or interdisciplinary subjects		√			
2	are in a position to discuss complex life science issues as well as own research results comprehensively and in the context of current international research and present these in writing (e.g., Master's thesis, scientific publication) and orally (e.g., lecture with free discussion)		√	√		
3	have gained subject-specific and interdisciplinary problem-solving competence.				√	√
General and Social Competences						
4	have gained the ability to combine specialized knowledge of various component disciplines, carry out independent scientific work and organize, conduct and lead more complex projects as well as publish the results			√	√	√
5	have acquired social competences, such as abstraction ability, systems analytical thinking, capacity for teamwork, ability to communicate, international and intercultural experience and others, and are therefore especially prepared to take on leadership responsibilities			√		

6	are in a position to also assess the social and environment-related effects of their actions	√				

4.4 Correlation between PLOs and Graduate Profiles

Table 4. Matric of the correlation between PLOs and Graduate Profiles (GP)

PLOs		GP1	GP2	GP3
1	Able to **internalize** an attitude of piety to God Almighty and love their country	√	√	√
2	Able to **develop** the biotechnological principles and other relevant sciences	√		
3	Able to **demonstrate** the ability to collaborate and to communicate well in verbal and in writing national and/or internationally	√	√	√
4	Able to **modify** skills and knowledge of DNA and protein-based biotechnology to produce innovative and useful biological products for agroindustrial sectors		√	
5	Able to **manage** biotechnology research comprehensively with a multidisciplinary approach to solve problems in agroindustrial sectors.		√	

4.5 Correlation between PLOs and Program Objectives (POs)

Table 5. Matric of the correlation between PLOs and Program Objectives (POs)

PLOs		PO1	PO2	PO3
1	Able to **internalize** an attitude of piety to God Almighty and love their country	√		
2	Able to **develop** the biotechnological principles and other relevant sciences	√		
3	Able to **demonstrate** the ability to collaborate and to communicate well in verbal and in writing national and/or internationally	√	√	√
4	Able to **modify** skills and knowledge of DNA and protein-based biotechnology to produce innovative and useful biological products for agroindustrial sectors	√	√	

5	Able to **manage** biotechnology research comprehensively with a multidisciplinary approach to solve problems in agroindustrial sectors.	√		

4.6 PLOs mapping

Table 6. Correlation between PLOs and Courses

NO	MODULEs	Credits (T-P)	PLOs												
			1		2		3		4			5			
			A	B	A	B	A	B	A	B	C	A	B	C	D
The 1st Semester															
General Compulsory															
1	Principles of Biotechnology	2 - 0			S										
2	Biochemistry and Molecular Biology	2 - 0			S										
3	Genetic Engineering and Bioinformatics	2 - 0			S		M		S						
4	Research Methodology	2 – 1			S			S					S		
Specific Compulsory															
Major in Agricultural Biotechnology (6 sks)															
5	Plant-Microbe Interactions	2 - 0				S			M						
6	Molecular Plant Physiology	2 - 0				S			M						
7	Biosynthesis of Primary and Secondary Metabolites	2 - 0				S				M					
8	Biochemical Product Engineering	2 - 0				S			M						
9	Molecular Detection in Agriculture	0 - 2					S		S				M		M
Major in Medical Biotechnology (4 sks)															
10	Gene Therapy	2 - 0	S	S		S									
11	Biopharmaceutical Innovation	2 - 0				S					S				
12	Molecular Immunology	2 - 0				S									
13	Molecular Detection in Medicine	0 - 2					S		S				M		M
The 2nd Semester															
14	Cell Propagation	2 - 0			S										
15	Bioprocess Engineering	2 - 0				S			M						
16	Regulation of Genetic Engineering Product	2 - 0	S	S		M						S			

NO	MODULEs	Credits (T-P)	PLOs												
			1		2		3		4			5			
			A	B	A	B	A	B	A	B	C	A	B	C	D
17	Entrepreneurship in Biotechnology	0 - 2	S	S					M	S	S				
18	Biostatistics	2 - 0				S									
The 3rd Semester															
19	Thesis	0 - 6	M					S					S	S	S
20	Dissemination of Research	0 - 1	W					S							
The 4th Semester															
21	Scientific Writing	0 - 2	W					S							
Elective Courses															
22	Enzyme Engineering	2 - 0			S		M								
23	Biotechnology in Plant Protection	2 – 0				S	M								
24	Industrial Microbiology	2 – 0				M	S					S			
25	Fermentation Technology	2 – 0				S				S					
26	Enzyme Production	2 – 0				S				M					
27	Bio-nanotechnology	2 – 0				S				S					
28	Analysis of Biomolecules	2 – 0				S				S					
29	Metabolic Engineering	2 – 0				S				S					
30	Molecular Virology	2 – 0			S		M								
31	Cancer Immunology	2 – 0			S		M								
32	Molecular Diagnostics	2 – 0			S				S						
33	Regenerative Medicine	2 – 0			S		M								
34	Personalized Medicine	2 – 0	W		S				M						
35	Biobanking	2 – 0			S		M								

S=strong; M=mild; W=weak

5. Curriculum Structure and Distribution

Curriculum structures of Master in Biotechnology are provided in Table 7.

Table 7. Curriculum structure

Code	Type of modules	Credit	ECTS
PBU	General compulsory	20 (51.3%)	30.2
PBT/PBK	Specific compulsory	6 (15.38%)	9.06
PBP	Elective Courses	4 (10,52%)	6.04
PBU	Final Project	9 (23.07%)	13.59
Total		**39**	**58.89**

Distribution of modules in each semester as follow.

The 1st SEMESTER

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
General Compulsory							
1	PBU 2101	Principles of Biotechnology	2	0	2	3.02	-
2	PBU 2102	Biochemistry and Molecular Biology	2	0	2	3.02	-
3	PBU 2103	Genetic Engineering and Bioinformatics	2	0	2	3.02	-
4	PBU 2111	Research Methodology	2	1	3	4.53	-
Specific compulsory for Agricultural Biotechnology (6 credits)							
5	PBT 2101	Plant-Microbe Interactions	2	0	2	3.02	-
6	PBT 2102	Molecular Plant Physiology	2	0	2	3.02	-
7	PBT 2111	Biosynthesis of Primary and Secondary Metabolites	2	0	2	3.02	-
8	PBT 2112	Biochemical Product Engineering	2	0	2	3.02	-
9	PBT 2113	Molecular Detection in Agriculture	0	2	2	3.02	-
Specific Compulsory for Medical Biotechnology (6 credits)							
10	PBK 2101	Gene Therapy	2	0	2	3.02	-

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
11	PBK 2102	Biopharmaceutical Innovation	2	0	2	3.02	-
12	PBK 2103	Molecular Immunology	2	0	2	3.02	-
13	PBK 2112	Molecular Detection in Medicine	0	2	2	3.02	-
Total Workload			12	3	15	22.65	

The 2nd SEMESTER

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
1	PBU 2204	Cell Propagation	2	0	2	3.02	-
2	PBU 2202	Bioprocess Engineering	2	0	2	3.02	PBU 2103
3	PBU 2211	Regulation of Genetic Engineering Product	2	0	2	3.02	PBU 2101; PBU 2102; PBT 2113, or PBK 2112
4	PBP 2212	Entrepreneurship in Biotechnology	1	2	3	4.53	-
5	PBU 2205	Biostatistics	2	0	2	3.02	-
6	PBP	Elective Courses	4	0	4	6.04	-
Total workload			13	2	15	22.65	

The Elective Courses

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
1	PBP 2201	Enzyme Engineering	2	0	2	3.02	-
2	PBP 2203	Biotechnology in Plant Protection	2	0	2	3.02	PBT 2102
3	PBP 2204	Industrial Microbiology	2	0	2	3.02	PBT 2121
4	PBP 2213	Fermentation Technology	2	0	2	3.02	-
5	PBP 2214	Technology on Enzyme Production	2	0	2	3.02	-
6	PBP 2215	Bio-nanotechnology	2	0	2	3.02	-
7	PBP 2216	Analysis of Biomolecules	2	0	2	3.02	-

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
8	PBP 2217	Metabolic Engineering	2	0	2	3.02	-
9	PBP 2218	Molecular Virology	2	0	2	3.02	-
10	PBP 2219	Cancer Immunology	2	0	2	3.02	-
11	PBP 2112	Technology on Molecular Diagnostics	2	0	2	3.02	-
12	PBP 2219	Regenerative Medicine	2	0	2	3.02	-
13	PBP 2220	Personalized Medicine	2	0	2	3.02	-
14	PBP 2221	Biobanking	2	0	2	3.02	-

The 3rd SEMESTER

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
1	PBU 2213	Thesis	0	6	6	9.51	PBU 2111
2	PBU 2311	Dissemination of Research	0	1	1	1.51	PBU 2213
Total workload			0	7	7	11.02	

The 4th SEMESTER

No	Code	Module	Credit				Prerequisite
			Theory	Practicum	Total	ECTS	
1	PBU 2312	Scientific Writing	0	2	2	3.02	-
Total workload			0	2	2	3.02	

6. Evaluation of Student Achievement

Evaluation is held at the end of each semester and aim to determine the possible study load that can be taken in the following semester based on the GPA achievement. The final semester evaluation is accomplished through learning outcomes evaluation with the minimum passing scores as follow.

Table 8. Minimum Passing Score of PLO

No	Learning Outcomes	Minimum Passing Score
ATTITUDE		
PLO1	Able to internalize an attitude of piety to God Almighty and love their country	80

KNOWLEDGE		
PLO2	Able to develop the biotechnological principles and other relevant sciences	75
GENERAL SKILLS		
PLO3	Able to demonstrate the ability to collaborate and to communicate well in verbal and in writing national and/or internationally	75
SPESIFIC SKILLS		
PLO4	Able to modify skills and knowledge of DNA and protein-based biotechnology to produce innovative and useful biological products for agroindustrial sectors	75
PLO5	Able to manage biotechnology research comprehensively with a multidisciplinary approach to solve problems in agroindustrial sectors.	75

7. Internal Quality Assurance System of Curriculum Implementation

Quality assurance in Postgraduate Program of Master in Biology applies the Planning, Actuating, Evaluating, Controlling, Improving (PPEPP) cycle and has been administered at Universitas Jember. In the PPEPP cycle, the study program along with quality assurance team, namely QAU (Quality Assurance Unit), implement the quality standards preparation activity derived from the Faculty Standards and University Standards. The standards addressed are the overall standards in regulating the Education, Research, and Community Services and exceptional standards by the Universitas Jember.

Regarding the quality assurance of curriculum implementation, the Postgraduate Program of Master in Biology refers to the PPEPP cycle as well. In guaranteeing curriculum implementation, the process initially begins with developing the standards that act as the barometer for minimum services and minimum achievements to be actualized in the curriculum implementation. The Head, later on, approves this standard of Study Program for further implementation (as PP in PPEPP cycle). Furthermore, the QAU periodically evaluates the curriculum implementation. The evaluations are carried out starting from the process of implementation to the implementation results. The results of the evaluation are applied as the basis for controlling and improving stages. If the results indicated that the curriculum implementation had not achieved the targeted standards, further action would be given in the form of warnings and space for enhancement. However, suppose the evaluation results show that the curriculum implementation has already met the targeted standards. In that case, there will be an analysis of what aspects can still be improved to be the new standards in the Postgraduate Program of Master in Biology.

Technically, the application of the PPEPP cycle in the stages of monitoring and evaluating is described as follows.

The monitoring is performed regularly three times in a semester. The first one is carried out before the academic semester starts. This evaluation aims to examine the readiness and preparation of the lecturers for the upcoming semester. The examination covers the administrative appropriateness to the substantive part of the preparation in curriculum implementation. Furthermore, the second monitoring is held in the middle of the semester to check the curriculum implementation. Meanwhile, the third monitoring is at the end of the semester and aims to assess the accomplishments. The indication of standards accomplishment is stated previously. The curriculum will be thoroughly evaluated after two years.