ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Biology

Master's Degree Programmes
Biology
Chemistry

Doctoral Programme
Chemistry

Provided by
Universitas Padjadjaran (UNPAD) – Indonesia

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A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committee (TC)[2]
Sarjana Biologi	Bachelor in Biology	ASIIN	National accreditation agency: LAMSAMA. Valid until: 13 December 2027	10
Magister Biologi	Master in Biology	ASIIN	National accreditation agency: LAMSAMA. Valid until: 21 August 2027	10
Magister Kimia	Master in Chemistry	ASIIN	National accreditation agency: LAMSAMA. Valid until: 27 February 2028	09
Doktor Kimia	Doctor in Chemistry	ASIIN	National accreditation agency: BAN-PT. Valid until: 12 July 2026	09
Date of the contract: 18.09.2023 **Submission of the final version of the self-assessment report:** 15.12.2023 **Date of the on-site visit:** 15. – 16.05.2024 **At:** Universitas Padjadjaran, Jatinangor Campus **Location:** Sumedang, Indonesia.				
Expert panel:				

[1] ASIIN Seal for degree programs

[2] TC: Technical Committee for the following subject areas: TC 09 - Chemistry; TC 10 - Life Sciences.

Prof. Dr. Wolfgang Nellen, Universität Kassel Prof. Dr. Martin Jäger, University of Applied Sciences Niederrhein Assoc. Prof. Dr. Gratiana Wijayanti, Jenderal Soedirman University Dr. Jens Meissner, BASF SE Mr. Muhammad Ibrahim, student at Sebelas Maret University	
Representative of the ASIIN headquarter: Dr. Emeline Jerez	
Responsible decision-making committee: Accreditation Commission for Degree Programs	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2023 Subject-Specific-Criteria of the Technical Committee 09 – Chemistry as of 29.03.2019 and the Technical Committee 10 – Life Sciences as of 28.06.2019	

B Characteristics of the Degree Programs

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Bachelor program in Biology	S.Si./B.Sc.	Biology	Level 6	Full time	No	8 semesters	144 credits equivalent to 260.64 ECTS	Annually (August) First offered in 1958
Master program in Biology	M.Si./M.Sc.	Biology	Level 7	Full time, by course	No	4 semesters	39 credits equivalent to 70.59 ECTS	Annually (August) First offered in 2014

[3] EQF = The European Qualifications Framework for lifelong learning

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Master program in Chemistry	M.Si./M.Sc.	Chemistry	Level 7	Full time, by course	No	4 semesters	38 credits equivalent to 68.78 ECTS	Annually (August) First offered in 1984
Doctoral program in Chemistry	Dr.	Chemistry	Level 8	Full time, by Research	No	6 semesters	42 credits equivalent to 76.02 ECTS	Annually (August) First offered in 1992

The experts acknowledged and considered the contextual framework within which the Bachelor's, Master's and Doctoral study programs currently being assessed are offered:

Universitas Padjadjaran (Unpad) is a public institution of higher education that was established in 1957. The university is located in the province of West Java, Indonesia, and its primary campus is situated in Jatinangor, Sumedang. Unpad's other campuses are Dipati Ukur in Bandung, Garut, and Pangandaran.

Accounting for over 38,000 enrolled students, the university offers 190 educational programs. These range from vocational and undergraduate to postgraduate programs, including specialist, professional, master's, and doctoral programs. The university comprises 16 faculties and a Postgraduate School that oversees the master's and doctoral programs in interdisciplinary science and carries out quality assurance duties for postgraduate programs organised by faculties.

As per its vision statement, the University aims to "become a world-renowned university bringing great impacts on society". In the 2025 QS World Universities Ranking, Unpad is ranked 7th in Indonesia and 596th in the world.

The Faculty of Mathematics and Natural Sciences

Fakultas Matematika dan Ilmu Pengetahuan Alam is one of the foundational faculties established during the early years of the university's existence. Currently, it offers 17 study programs, with one of them being awarded international accreditation. Building on this achievement, the Faculty is committed to expanding international accreditations across its programs.

The Faculty's vision is "to become a superior faculty in education and research that is internationally recognized and has an impact on society". In realising this vision, the Faculty of Mathematics and Natural Sciences' mission is:

> "to provide research-based education to produce graduates who adaptive and innovative in facing developments in science and technology at the international level, carry out basic and applied science research, especially in the management of natural resources, energy and the environment, build partnerships with government institutions and industry, implementing adaptive, accountable and transparent governance and meeting international standards in managing the Tridharma of higher education and building human resources in accordance with their competencies and having a culture of responsible, excellent, scientific rigor, professional, encouraging, creative and trust (RESPECT)."

As part of this procedure, the Faculty of Mathematics and Natural Sciences pursues ASIIN accreditation for the ***Bachelor's program in Biology***, ***Master's program in Biology***, ***Master's program in Chemistry*** and ***Doctoral program in Chemistry***, which the University refers as to BPB, MPB, MPC and DPC, respectively, within the provided documentation. The programs are introduced with the following profile:

i. Bachelor's program in Biology

Program Learning Objectives:

1. "PLO-1 Produce graduates who are ready to learn throughout their lives through further studies, research, and professional activities at the national or international level.
2. PLO-2 Produce graduates who have the ability to use knowledge and skills in the field of biology, including the exploration and application of biological and environmental resources, as well as other relevant fields.
3. PLO-3 Produce graduates who can apply biology with sustainable and environmentally friendly concepts and understand professional responsibilities in society."

ii. Master's program in Biology

Program Learning Objectives:

1. "PLO-1 Capable of applying biology knowledge in a professional setting, demonstrates a religious attitude, independently, has a strong work ethic,

discipline, creativity, communication skill, a commitment to uphold local culture, and a profound understanding of cutting-edge technology, allowing them to compete at both the national and international levels.
2. PLO-2 Capable of applying biological scientific concepts, generating outstanding research and innovation, incorporating the most recent scientific advances, and participating in problem-solving related to biological and environmental resource management in an interdisciplinary and transdisciplinary manner that has a positive impact and benefit for society.
3. PLO-3 Graduates are provided with the knowledge and expertise necessary to pursue advanced education or a professional career in the subjects of Biology, Biological Resource and Environmental Management, or scientifically related fields."

iii. Master's program in Chemistry

Program Learning Objectives:

1. "PLO-1 Formation and character development of masters of chemistry who master the concepts of chemistry and apply them to the utilization of natural resources and the environment through independent research.
2. PLO-2 Increasing multidisciplinary research products in the form of scientific publications and/or patents in the field of natural products (biological and non-biological) and the environment that can be used for the development of science and technology and public welfare.
3. PLO-3 Improving the quality and quantity of research and publication collaboration with domestic and foreign institutions."

iv. Doctoral program in Chemistry

Program Learning Objectives:

1. "PLO-1 Mastering chemical concepts properly thus can be able to develop the knowledge independently in accordance with scientific code of ethics in the field of specific topics based on their interests.
2. PLO-2 Being able to apply their knowledge to the utilization of natural resources with all its aspects and implications.
3. PLO-3 Being able to create a research plan that can generate novelty that is the result of research, conduct and interpret research, and disseminate the results through seminars and scientific publications as well as intellectual property rights.

4. PLO-4 Being able to carry out intra-, inter-, and multi-disciplinary research for the development of science and technology and community welfare."

As discussed with the Rector's office representatives, Unpad's vision, as stated in the 2020-2024 Strategic Plan, is to become a world-renowned university bringing great impacts on society. Therefore, pursuing international accreditation is an institutional priority. It is a means to strengthen study program excellence with international recognition. Currently, there are 46 internationally accredited study programs at Unpad.

C Expert Report for the ASIIN Seal

1. The Degree Program: Concept, Content & Implementation

Criterion 1.1 Objectives and Learning Outcomes of a Degree Program (Intended Qualifications Profile)

Evidence:

- Self-assessment report
- Objectives-Module-Matrices as part of the self-assessment report
- BPB website: https://biologi.unpad.ac.id/en/s1-biologi/
- MPB website: https://biologi.unpad.ac.id/en/s2-biologi/
- MPC website: https://chemistry.unpad.ac.id/master-degree/
- DPC website: https://chemistry.unpad.ac.id/doctoral-degree-program/
- Curriculum documents, all programs under review
- MBKM Guide, Implementation Guide for the Independent Campus Learning Program (MBKM) Bachelor's Program In Biology 2023
- Discussions during the audit

Preliminary assessment and analysis of the experts:

i. Learning Outcomes

At the program level, there are two tiers of development for the educational objectives of the programs under review, as elaborated in the self-assessment report and the Curriculum documents:

a) Program Learning Outcomes (PLOs as presented in Section B) and
b) Intended Learning Outcomes (ILOs as presented in the Appendix).

As documented, the programs' PLOs and ILOs are designed around the graduate profile, which draws on market signals and the vision of science. This involves a stakeholder process facilitated by an Advisory Board in the Department of Biology and Department of Chemistry, respectively, and benchmarking against pertinent national and international standards and references. The programs' ILOs align with the Indonesian National

Qualification Framework (*Kerangka Kualifikasi Nasional Indonesia, KNNI)*, the National Higher Education Standards, Unpad's vision and mission and the mandate of the Faculty of Mathematics and Natural Sciences.

Based on the Indonesian National Qualification Framework*,* the ILOs are distinguished as aspects of Attitude (*sikap*), Knowledge (*pengetahuan*), General Skills (*kemampuan umum*), and Special Skills (*kemampuan khusus*).

Within the provided documentation, the University presents tabular mappings of linkages between ILOs and PLOs, modules and ILOs, as well as ILOs and ASIIN's subject-specific criteria.

PLOs and ILOs can be accessed through various mediums, including the student handbook, study program websites, and promotional materials.

In the course of their assessment, the experts attest that the learning outcomes of the programs correspond to level 6 (Bachelor's program in Biology), level 7 (Master's program in Biology and Master's program in Chemistry), and level 8 (Doctoral program in Chemistry) of the European Qualification Framework (EQF), respectively. The ILOs have been designed by considering the Indonesian National Qualification Framework, the provisions of the corresponding Indonesian professional and scientific associations and using the instrument of internal and external benchmarking. Moreover, the experts assess that the outlined objectives suffice the ASIIN Criteria for the Accreditation of Degree Programmes. Further discussion of the curricula will follow under Criterion 1.3.

ii. Graduate Qualification Profiles

The ***Bachelor's program in Biology*** is expected to produce lifelong learners who engage in further studies, research, and professional activities, and utilise biology knowledge and skills in exploring and applying biological and environmental resources. They are also expected to apply sustainable and environmentally friendly concepts.

The ***Master's program in Biology*** aims to produce graduates able to apply biology knowledge in professional settings, utilise biological scientific concepts, and conduct significant research and innovation. They are provided with the knowledge and expertise to pursue advanced education or professional careers in Biology, Biological Resource and Environmental Management, or related scientific fields. **The expert team encourages the University to expand these career options. For example in Europe, biologists are well accepted in many fields even outside bio-science, including but not limited to patent offices, medicine, material sciences, IT, pharmacy, instrumentation, and counselling.**

The ***Master's program in Chemistry*** is anticipated to produce graduates who master chemistry concepts and apply them to natural resources and the environment, increase

multidisciplinary research products, and improve the quality and quantity of research and publication collaboration.

The ***Doctoral program in Chemistry*** expects its graduates to master chemical concepts and thus be able to develop knowledge independently by scientific code of ethics. They are anticipated to create a research plan, conduct and interpret research, disseminate the results through seminars, scientific publications and intellectual property rights, and carry out intra-, inter-, and multi-disciplinary research.

Tracer studies conducted by the Faculty have shown that the BPB graduates are employed in numerous companies. Some students from the MPB, MPC and DPC, already employed, have taken further studies to increase their capacity in the workplace. The graduates from the MPB, MPC, and DPC are employed in the field as researchers, lecturers, and entrepreneurs.

During the discussion with the assessment team, students and alumni expressed their satisfaction with the programs under review, the learning experience, and future job prospects.

The experts note that several lines of evidence indicate that students are well prepared for entering the job market, and employers are satisfied with the knowledge and technical skills of the graduates. In particular, they confirmed their willingness to take in student interns and graduates, highlighting their strong work ethics. **However, the assessment team identified an area for further improvement in the Bachelor's and Master's programs, particularly in the development of technical and non-technical skills and attitudes. The recommendation is to enhance students' skills, with a focus on resilience (including research and good scientific practice, handling failure, entrepreneurship and economics). This improvement is seen as important in preparing the students more comprehensively for their future careers.**

Aside from this, the expert panel gained the overall impression that the imparted qualification profiles of the programs satisfy expectations from all sides and allow the students to take up employment corresponding to their qualifications upon their graduation.

iii. Review of Learning Outcomes

The University's self-assessment report states that learning outcomes and curricula are reviewed every 3-5 years. These reviews involve internal and external stakeholders, respective consortiums and professional associations, and benchmarking with other national and international universities. Minor evaluations on the progress of the learning outcomes are conducted each semester without restructuring.

The ***Doctoral program in Chemistry*** adhered to a research-based curriculum in 2019. The curriculum is likewise reviewed every five years based on a stakeholder process involving lecturers, students, external parties and alumni.

When asked about the involvement of students and other stakeholders in the review of the learning outcomes, the program coordinators confirmed the use of various feedback mechanisms and representation on departmental advisory boards. Additionally, industry partners participating in the audit acknowledged their involvement and role in these advisory boards.

From the provided documentation, their exchanges during the audit, as well as the further discussion about the University's quality assurance mechanisms under Criterion 1.3 and Criterion 5 below, the experts gain the impression that appropriate, recurring review mechanisms concerning the objectives and learning outcomes of the programs under review are in place.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-assessment report
- Faculty Mathematics and Natural Sciences website: http://fmipa.unpad.ac.id
- Curriculum Documents, all programs under review
- Sample Diploma, all programs under review
- Sample Diploma Supplement, all programs under review

Preliminary assessment and analysis of the experts:
As outlined by the University in its self-assessment report, the naming of the degrees awarded follows the regulation of the Minister of Research, Technology and Higher Education No. 257/M/KPT/2017 and the Unpad Rector's decree No. 411/UN6.RKT/Kep/2016.

Graduates of the ***Bachelor's program in Biology*** are conferred the title Sarjana Sains (S.Si.) or Bachelor of Science (B.Sc.). Meanwhile, graduates of the ***Master's programs in Biology and Chemistry*** receive the title Magister Sains (M.Si) or Master of Science (M.Sc.). ***Doctoral program*** graduates receive the title Doktor (Dr.), signifying Doctor in Chemistry.

The experts confirm that the English translation and the original Indonesian names of the study programs under review are appropriate and correspond to the programs' intended aims and learning outcomes.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- BPB website: https://biologi.unpad.ac.id/en/s1-biologi/
- MPB website: https://biologi.unpad.ac.id/en/s2-biologi/
- MPC website: https://chemistry.unpad.ac.id/master-degree/
- DPC website: https://chemistry.unpad.ac.id/doctoral-degree-program/
- Curriculum documents, all programs under review
- Unpad Academic Calendar 2023/2024: https://www.unpad.ac.id/pengumuman/kalender-kegiatan-akademik-unpad-tahun-akademik-2023-2024/
- Rector's decree No 46/2016 regarding the Implementation of Education at Unpad
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The curricula, structure, and composition of the study programs under review are presented in the University's provided "Curriculum Documents", including the educational and module handbooks. As per the self-assessment report, the programs are aligned with the Indonesian Qualification Framework and the National Standards for Higher Education. Moreover, both the ***Bachelor's and Master's programs in Biology*** adhere to the standards set by the Indonesian Biology Consortium. While the ***Master's and Doctoral programs in Chemistry*** comply with the standards set by the Indonesian Chemical Society.

i. Structure of the Programs

Each semester is equivalent to 16 weeks, including 14 weeks of learning activities and 2 weeks for midterm and final exams. The odd semester starts in August and ends in January, and the even semester lasts from February to July.

The ***Bachelor's program in Biology*** comprises 144 Indonesian Credit Points and has a formal duration of 8 semesters. The Bachelor's curriculum consists of a) university character development courses in personality and communication skills, b) core study material for national biology and special characteristics of Indonesian national biology, c) biology technical and practical work, d) methodological competence in life sciences and its application in biology, e) transferable skills with the MBKM (*Merdeka Belajar - Kampus Merdeka* - Independent Learning-Independent Campus) program approach, and f) course

for study interest based on subject-related competences. The academic program concludes with the writing of a Bachelor's thesis.

The ***Master's program in Biology*** involves a minimum of 38 Indonesian Credit Points, with a duration of 4 semesters of study. It consists of compulsory courses based on the Indonesian National Qualification framework as well as specialisation and skill-supporting courses. Completing the Master's degree requires a publication and writing a final Master's thesis.

The ***Master's program in Chemistry*** consists of 39 Indonesian Credit Points and has an expected duration of 4 semesters. The curriculum is structured around fundamentals for Master of Chemistry courses, MCP advanced courses, research and thesis.

Further details regarding the Indonesian Credit System and its alignment with the European Credit Transfer and Accumulation System (ECTS) can be found under Criterion 1.5.

Doctoral program in Chemistry

Discussed in section D 2 of the "Additional Criteria for Doctoral Programs".

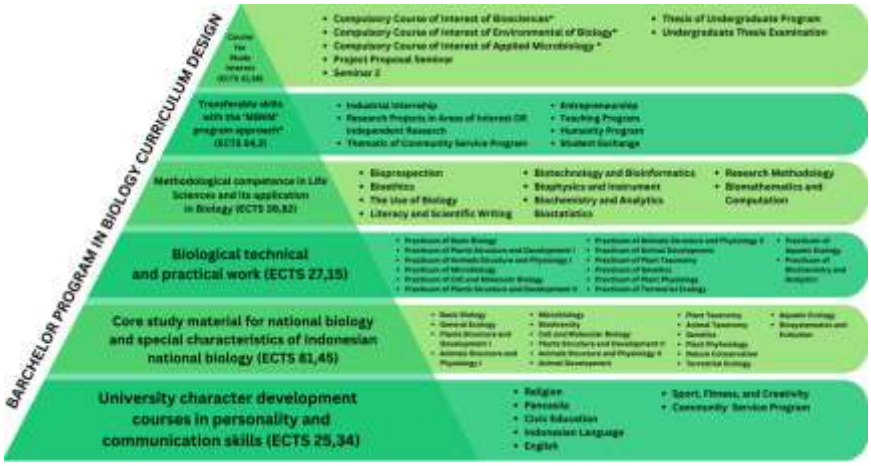
ii. Contents

Bachelor's program in Biology

As outlined in the previous section, the curriculum consists of various course categories (see figure below). It offers three specializations aimed at addressing future challenges in biological science and achieving the established Graduate Profile (PLOs): Biosciences, Environmental Biology, and Applied Microbiology.

Compulsory courses of interest by specialization include:

> **Biosciences:** Bioprospection of Beneficial Plants, Digitalization of Biological Objects, Animal Biotechnology, Plant Biotechnology, Field Study.
> **Environmental of Biology:** Research Methodology of Ecology, Tropical Biodiversity, Human Ecology, Field Study.
> **Applied Microbiology:** Environmental Microbiology, Industrial and Applied Microbiology, Field Study.



Learning program model and workload of BPB. Source: Self-assessment report, Unpad.

Regarding the *Bachelor's program in Biology*, the expert group inquired with the program coordinators about the terminology used to describe the specializations, noting that the first appears to encompass the second and third. The program coordinators expressed agreement with this perception. Therefore, the assessment team recommends that the study program consider the names of the specializations as "Biosciences", "Environmental Biology", and "Applied Microbiology" are not at the same level of definition.

Independent Learning-Independent Campus courses are also integrated into the curriculum (more in the Mobility Section). The final Thesis in the eighth semester is preceded by a Research Proposal Seminar in which students learn how to conduct research.

Master program in Biology

The curriculum is organised based on the following content:

I. **Compulsory biology courses** based on the Indonesian National Qualification Framework and the Indonesian Biology Consortium consist of modules such as:

   Philosophy and Biological Ethics, Biology of Qualitative and Quantitative, Scientific Communication, Biodiversity, Ecosystem Service, Climate Change and Special Courses based on research focus (max 1 - Integrated Ecology, Biosystems and Molecular Biology and Applied Microbiology and Biotechnology)

II. **Specialization and skill-supporting courses** comprise the following: Research Proposal and Seminar, Mandatory Elective courses and Elective courses (Max. 2 – see Appendix for detail). Mandatory Elective courses enable students to deepen their knowledge in their respective areas of interest and, hence, individualise their study path. They are grouped into the three areas of specialization:

Integrated Ecology cluster: Biological Conservation, Biomanagement and Pollution Ecology.
Biosystem and Molecular Biology cluster: Embryogenesis in Environmental Stress, Environmental Physiology, and Biosystematics.
Applied Microbiology and Biotechnology cluster: Industrial and Environmental Microbiology, Microorganism Bioprospecting and Microbial Ecology.

III. **Research and publication courses** involve Research and Dissemination and Research Result Seminar.

IV. **Capstone course and Thesis** involve the Master Thesis Defense and Publication.

Master students focus on their research projects from the second semester with the Research proposal and seminar. The fourth semester involves thesis defense and publication.

Concerning the content in the curricula of the *Bachelor's and Master's programs in Biology*, the assessment panel asked the program coordinators about how the University incorporates modern knowledge and ensures that subjects are up-to-date. The program coordinators explained that this is achieved through a range of elective and mandatory courses. For instance, mandatory courses include biodiversity and sustainable development, while the curriculum also integrates biomolecular and biotechnology subjects. Additionally, partnerships with academic institutions provide students access to advanced equipment and knowledge. The assessment team is under the impression, however, that in the modules there is no mention, for example, to modern biotechnology or environmental engineering. They believe these areas should be included in the curriculum, on both theoretical knowledge and practical skills, to adequately educate students on current technologies. The panel suggests that both programs need to update their content to reflect modern technologies and research concepts.

The assessment team also observes that in Chemistry, the practical courses and the lectures are separate modules but in Biology, practical courses are somehow integrated into the lectures. In the experts' opinion, this underestimates the importance of practical work in biological sciences and does not allow insights in sufficient depth. Therefore, for the *Bachelor's and Master's programs in Biology*, the organisation of the practical work in separate modules according to the Chemistry example would be beneficial.

Master's program in Chemistry

The curriculum is organised based on the following content:

I. **Fundamentals for Master of Chemistry** consist of modules such as:

Research Methodology in Natural Science, Materials and Nano Chemistry, Separation Techniques, Cell-Building Biomolecules and Metabolism, Elucidation of Molecular Structure (Spectroscopy), Instrumental Analysis.

II. **Master's program in Chemistry advanced courses** are in line with research groups in the Department of Chemistry. They are divided into four areas:

Functional Material Courses: Computational Chemistry of Materials, Metal Oxide, Composite Chemistry, Solid and Surface Chemistry, Material and Characterization, Functional Material, Energetics Material

Chemical Separation and Analysis Courses: Quality Assurance of Analytical Methods, Data Analysis Processing Techniques, Advanced Chromatography, Advanced Chemometrics, Selected Topic of Analytical Chemistry, Advanced Analytical Laboratory Techniques.

Natural Products and Organic Synthesis Course: Advanced Physical Organic Chemistry, Advanced Organic Synthesis, Structural Elucidation of Organic Compounds, Natural Bioactive Compounds, Derivatization Reactions and Partial Synthesis, Biogenesis and Biosynthesis of Secondary Metabolites.

Biomolecular Health and Food Sciences Courses: Advanced Enzymology, Advanced Biochemistry, Biochemical Research Techniques, Biomembrane, Transport and Signal Transduction, Immunomodulator and Vaccine Development, Bioinformatics, Molecular Mechanism of Disease.

Upon reviewing the Biomolecular Health and Food Sciences courses, the experts believe that these advanced courses should also be offered to students in Biology. They hold the strong opinion that integrating these courses could significantly improve the Biology program.

III. **Research** involves the Research Proposal Seminar**.**

IV. Thesis

In the second year, students prepare for research through the Research Proposal Seminar course, followed by the Thesis course in the subsequent semester. Upon completing the Research Proposal Seminar, students conduct research, present their findings orally via presentations, and document their research in a thesis.

Upon reviewing the structure and content of the curricula for the Bachelor and Master's programs under review, along with the discussions held during the audit, the experts confirm that, apart from the comments mentioned above, these programs are suitable to adequately prepare students for the labour market.

Doctoral program in Chemistry

Discussed in section D 2 of the "Additional Criteria for Doctoral Programs".

iii. Internships

Internships are integrated into the ***Bachelor's program in Biology*** through the Independent Learning - Independent Campus (MBKM) activities. These activities encompass eight components, representing a mode of autonomous and flexible learning:

1. Internship/practical work in industry or other workplaces,
2. Community service project in the village
3. Teaching assistant in education units
4. Student exchange
5. Research
6. Entrepreneurship
7. Independent study/project
8. Humanitarian program

Students taking part in the MBKM program must have activity outputs, consisting of a logbook, progress report and final report.

During the audit, industry representatives confirmed that their companies have received students as interns. They view these internships as opportunities to collaborate with the University. For instance, one representative cited a project involving plant extraction that has benefited from student interns' contributions. Others highlighted their companies' ability to offer lab experiences to students across various projects. Additionally, industry partners confirmed the existence of agreements with the University and expressed satisfaction with hosting students from its programs.

iv. Mobility

During the audit, the students confirmed to the experts that Unpad promotes student mobility during the student journey. For example, students from the ***Bachelor's program in Biology*** emphasised the role played by lecturers in disseminating information on mobility programs. They judged the received information as adequate. ***Master's program in Chemistry*** students highlighted the one-year exchange opportunities, while ***Master's program in Biology*** students appreciated the opportunities they could get from their supervisors' research projects and funding. Several attendees confirmed that they have either gone abroad or have plans to do so in connection with these opportunities.

In terms of credit recognition for study performance achieved abroad, the University's "General Guidelines Implementation of Education at Universitas Padjadjaran" state the equivalency process as outlined further under criterion 1.5. This process is further facilitated through international and local agreements.

During the on-site visit, the program coordinators, students and teaching staff highlighted the collaborations established with international partners, including those in Japan, Malaysia, the Philippines, Korea Taiwan, France and Germany. The assessment team commends the University for its current collaboration with international partners, which provides mobility opportunities for students and staff.

As for funding opportunities to support students' mobility abroad, students and program coordinators confirmed the availability of scholarships. These include the international student exchange program for undergraduate students called IISMA, established in 2022 by the Ministry of Education, Culture, Research and Technology to encourage more students to participate in international mobility.

Doctoral program in Chemistry

Discussed in section D 2 of the "Additional Criteria for Doctoral Programs".

v. Curriculum Review

As mentioned under Criterion 1.1, the learning outcomes and curricula of the programs under scrutiny are reviewed every 3-5 years, involving feedback from students, staff, alumni, and industry partners to ensure alignment with their needs.

Based on the discussions, the expert panel noted that all groups highly appreciate the role of the Advisory Board in this process. This board is responsible for providing advisory input to the program coordinators, ensuring the managed study programs evolve and remain current with the latest developments in the corresponding field of study.

In general, the experts are satisfied with the provided information concerning the programs' curricular review procedures.

Criterion 1.4 Admission Requirements

Evidence:

- Self-assessment report
- Unpad website: https://www.unpad.ac.id/en/
- Unpad admission website: http://smup.unpad.ac.id/
- Unpad Academic Calendar 2023/2024: https://biologi.unpad.ac.id/en/kalender-akademik/
- Statistical data about the progress of studies, all programs under review

- Discussions during the audit

Preliminary assessment and analysis of the experts:

Bachelor's program in Biology

Admission and selection of the prospective bachelor's program students are delimited by the Minister of Education, Culture, Research and Technology's regulation No 48/2022 concerning Admission of New Students to Diploma Programs and Undergraduate Programs at State Higher Education Institutions. The admission requirements, schedule, registration venue, and selection test are announced on Unpad's admission website and thus accessible to all stakeholders.

Admissions for the undergraduate programs are organised in several ways, as described as follows:

1. SNBP - National Selection Based on Achievement: Selection mechanism Based on academic performance at high school.
2. SNBT - National Selection based on Tests: Selection mechanism based on a nationwide selection test held annually for university candidates.
3. Local Admission (Test Score Track, Achievement Pathway and International Undergraduate Program): The selection mechanism is based on nationwide selection tests or Unpad local tests.

Intake is possible annually, with studies starting in August. The intake was 150 students in 2022. As part of its self-assessment report, the University has provided the following student numbers:

Table 1: Number of applications and accepted students BPB
Source: Self-Assessment Report, Unpad.

Admission Pathway	2018		2019		2020		2021		2022	
	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted
SNBP	1008	135	535	133	443	131	571	128	387	150
SNBT	1312		506		541		417		560	
Local Ad	-		121		263		485		519	
Total	2320	135	1162	133	1247	131	1473	128	1466	150

The experts confirm that the admission requirements support the Bachelor's students in achieving the intended learning outcomes.

Master's programs in Biology and Chemistry

As detailed in the self-assessment report, there are several pathways for admitting master's program students at the Faculty of Mathematics and Natural Sciences. These include 1) Regular student candidate selection system, 2) Fast-Track from Bachelor's to

Master's program, 3) Collaboration Track, 4) Master's Program Scholarship, 5) Student Exchange and 6) Outstanding Alumni Track.

Prospective students applying via the regular selection system need to fulfil several prerequisites. These include having a Bachelor's degree from an accredited university, a minimum Academic Ability Test (TKA) of 450 and fulfilling English proficiency requirements.

Admission is possible annually, with studies starting in August. The University has provided the following enrolment numbers as part of its self-assessment report:

Table 2: Number of applications and accepted students MPB and MPC
Source: Self-assessment report, Unpad.

Program	2018		2019		2020		2021		2022	
	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted
MPB	8	7	6	6	7	7	26	23	14	14
MPC	27	27	29	29	41	39	67	59	22	20

The experts are under the impression that admission for incoming Master's students shows positive outcomes. The selection process appears to have effectively identified candidates well-suited for the programs offered.

Doctoral program in Chemistry

The self-assessment report details the diverse ways used to admit students into the doctoral programs at the Faculty of Mathematics and Natural Sciences. These include 1) Doctoral program regular admission path, 2) Fast-Track from Master's to Doctoral program, 3) Collaborative Doctoral program, 4) Padjadjaran Doctoral program Scholarship, 5) Student Exchange for Doctoral Program, and 6) Outstanding and High-Performance Doctoral.

Applicants for doctoral studies in Chemistry need to fulfil a number of prerequisites. Besides having a Master's or Applied Master's or Specialist Education diploma, they need to provide an IELTS score of a minimum of 5.0 or equivalent. Moreover, applicants must score at least 500 on the Academic Ability Test (TKA). They must succeed in an interview with an academic panel, attach a letter of willingness to mentor, possess two letters of recommendation from a lecturer or university leader and have a statement of purpose. Students of the Master's, Applied Master's, or Specialist Programs at Unpad can apply via the Fast-Track program.

Admission is possible annually for the August intake. The University has provided the following enrolment numbers as part of its self-assessment report.

Table 3: Number of applications and accepted students DPC
Source: Self-assessment report, Unpad.

Program	2018		2019		2020		2021		2022	
	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted	Applicants	Accepted
DPC	11	11	9	9	8	8	24	20	22	21

The experts confirm that the admission requirements support the Doctoral students in achieving the intended learning outcomes. The majority of students persist and graduate.

The tuition fee for the Bachelor's program in Biology varies from 500,000 to 8,000,000 IDR (28 to 455 Euro) per semester depending on the parents' income. For the Master's program, the tuition fee is 10,500,000 (600 Euro) per semester. For the doctoral program, the tuition fee is 14,000,000 (800 Euro) per semester.

In assessing this criterion, the experts find that (prospective) students are informed in detail about the requirements and the necessary steps to apply for admission into the programs under review. This information can be accessed through the dedicated Unpad admission website and the academic guidelines. The corresponding rules and regulations are binding and transparent and are based on decrees by the Ministry of Research, Technology and Higher Education and on the University's written regulations.

Criterion 1.5 Workload and Credits

Evidence:

- Self-assessment report
- Curriculum Documents, all programs under review
- Credit conversion tables; all programs under review
- Academic Guidelines, all programs under review
- Dean's decree No 612.a/UN6.D/Kep/FMIPA/2022
- Rector's decree No 46/2016 regarding the Implementation of Education at Unpad
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

Study programs at Unpad must follow the Indonesian credit system (SKS) regulations. Each credit point is distributed between guided and independent learning activities, as well as between face-to-face activities, laboratory activities/practicum, and project and field practice. According to the National Standards for Higher Education (SNPT), the learning activities are lectures, responses and tutorials, seminars, and practicum. One credit of lecture and practicum is equivalent to 170 minutes per week per semester, with 50 minutes for a face-to-face activity, 60 minutes for structured assignments, and 60 minutes for individual study. According to the Dean's decree No 612.a/UN6.D/Kep/FMIPA/2022, 1 Indonesian credit is equivalent to 1.81 ECTS. Below is a detailed breakdown of the workload per semester for each program:

Table 4: Credits and ECTs of workload per semester for BPB, MPB, MPC, and DPC
Source: Self-assessment report, Unpad.

Semester	BPB		MPB		MPC		DPC	
	Credits	ECTs	Credits	ECTs	Credits	ECTs	Credits	ECTs
1	19	34.39	15	27.15	15	27.15	8	14.48
2	21	38.01	12	21.72	15	27.15	3	5.43
3	21	38.01	6	10.86	2	3.62	3	5.43
4	20	36.20	6	10.86	6	10.86	11	19.91
5	20	36.20					6	10.86
6	19	34.39					11	19.91
7	17	30.77						
8	7	12.67						
Total Credit	**144**	**260.87**	**39**	**70.59**	**38**	**68.78**	**42**	**76.02**
Non- Credit				52.94		56.96		108.8
Total		**260.87**		**123.53**		**125.74**		**184.82**

Bachelor's program in Biology

The Bachelor's program curriculum requires a minimum study load of 144 credits (260.64 ECTS). Students must complete 11 credits of compulsory university courses (19.91 ETCs), 93 credits of compulsory biology courses (168.3 ETCs), and 10 credits of compulsory courses of interest (18.1 ECTs). During the 6th and 7th semesters, the BPB offers students the option to participate in the MBKM Program and/or Elective Courses, requiring a minimum of 30 credits (54.3 ETCs).

The semester GPA determines the maximum number of credits students can take the following semester, with a maximum of 24 SKS if the GPA range is 3.00-4.00. Bachelor's students are required to attend their classes in accordance with established regulations. They must be present for at least 80% of theoretical courses and 100% of practical courses. If a student's attendance falls below these percentages, they are not allowed to attend the final examination. The maximum time to complete the academic program is 14 semesters.

During the discussions, there were concerns about the heavy workload in the third semester of the *Bachelor's program*, in terms of practicums and exam preparation. Recognising this concern, the assessment team believes there is a need for the program to evaluate the workload distribution during the third semester to ensure it is appropriately balanced.

Master's programs in Biology and Chemistry

The ***Master's program in Biology*** curriculum requires a minimum study load of 39 credits (70.59 ECTS). Students are required to complete 12 credits of compulsory courses (21.72 ECTS), 3 credits of required specialization courses (5.43 ECTS), 10 credits of elective courses (18.1 ECTS), 2 credits of research proposals and seminars (3.62 ECTS), 5 credits of research and dissemination (9.05 ECTS), 1 credit of research seminars and thesis (1.81 ECTS) and 6 credits of publication sessions (10.86 ECTS).

The ***Master's program in Chemistry*** curriculum requires a minimum study load of 38 credits (68.78 ECTS). Students are required to complete 15 credits of fundamentals for Master of Chemistry courses (27.15 ECTS), 15 credits for advanced courses (27.15 ECTS), 2 credits for Research (3.62 ECTS) and 6 credits for the Thesis (10.86 ECTS).

The Master's programs can be completed within the standard period of study (2 years), and a maximum of 4 years.

Based on the information gathered during the visit and as detailed in the self-assessment report, the assessment team noted the inclusion of non-credited activities in the total ECTS calculation for the MPB and MPC curricula. In the MPB curriculum, the total ECTS amounts to 123.53, with 70.59 ECTs attributed to credited topics and 52.94 ECTs from non-credited activities. Similarly, the MPC curriculum totals 125.74 ECTs, comprising 68.78 ECTs from credited subjects and 56.96 ECTs from non-credited activities. The expert panel strongly believes that both Master's programs need to establish a workload-adequate credit point system (non-credited courses).

Furthermore, the experts learned that the process for determining the number of credits in the Bachelor's and Master's curriculum involves a curriculum workshop led by lecturers, followed by evaluation and review from stakeholders, students, alumni, associations, and scientific curriculum experts. However, they did not find evidence confirming that it is regularly monitored whether the credits awarded for each module correspond to the actual student workload. Consequently, the panel asks that the University establish a formal and systematic monitoring of the actual student workload and verify the credits awarded.

Doctoral program in Chemistry

The doctoral program has a minimum requirement of 42 credits (76.02 ECTS). The cumulative study load consists of 5 credits for the Research Proposal Seminar (9.05 ECTS), 3 credits for the Research Skills Course (5.43 ECTS), 2 credits for Writing of Review Articles (3.62 ECTS), 1 credit each for Research Progress Seminars 1 and 2 (3.62 ECTS), 2 credits for Teaching Skills Course (3.62 ECTS), 9 credits for Research Publication (16.29 ECTS), 3 credits for Research Result Seminar 5.43 ECTS, 2 credits for National Seminar/Conference Speaker (3.62 ECTS), 3 credits for International Seminar/Conference Participant (5.43 ECTS), 6 credits for Dissertation Manuscript Review (10.86 ECTS) and 5 credits for Doctoral Degree Promotion Presentation (9.05 ECTS). The doctoral degree can be completed in a standard study period of 3 years and a maximum of 7 years (14 semesters). **Regarding the required credits in the Doctoral program in Chemistry, the experts request clarification from the University on whether there are any credits for the thesis work itself. Additionally, they**

seek clarification on the proportion of time students spend in the lab conducting experiments.

Similar to the Master's programs, in the Doctoral program in Chemistry curriculum, the total ECTs is 184.82 as it is composed of 76.02 ECTs from credited subjects but also 108.8 ECTs from non-credited activities. The expert panel emphasises once again the need for both the *Master's and Doctoral programs* to establish a credit point system that appropriately reflects workload, including non-credited courses.

In response to questions about the workload, Master's and Doctoral students did not highlight any significant imbalance or excessive workload during the audit. They reported having sufficient time to participate in other activities outside study.

For the four programs under review, the University provided key performance indicator data in its self-assessment report, including metrics such as dropout statistics (including resignations) and average study period. Analysis of the 2018–2022 cohorts shows that among students registered in the ***Bachelor's program in Biology,*** 9% had resigned. Despite this, the data indicate that most students persist, although the average completion time slightly exceeds the standard study period, averaging 4.6 years in 2022.

According to the statistical data, the number of resignations in the ***Master's programs*** remains low. Between 2020 and 2022, the resignation rates were 2.5% (1 out of 39 students) for the ***MPB*** and 3.4% (4 out of 118 students) for the ***MPC*** during the same period. The figures also show that students complete the programs within the expected duration, averaging 2 years for the ***MPB*** and 1.5 years for the ***MPC*** in 2022.

For the ***Doctoral program in Chemistry***, the resignation rate for the 2020-2022 cohorts reached 6%. This suggests that most students persist in their studies although the average completion time slightly exceeds the standard study period, standing at 4.6 years in 2022.

In general, the data show that almost all students complete the study programs, with relatively low dropout rates reported for the four programs. These numbers suggest that the programs under review can be successfully completed.

The experts confirm that regulations for the transfer of credits obtained outside of Unpad exist (Rector's decree No 46/2016 regarding the Implementation of Education at Unpad). The experts also attest that the program's module handbooks clearly distinguish between credits given for various forms of supervised studies and self-study time.

In their appreciation of this criterion, the experts confirm that a credit system is in place, and that this encompasses both contact hours and self-study time. **However, as previously**

discussed, they were unable to verify at this stage whether credits have been allocated appropriately in accordance with the associated workload.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-assessment report
- Educational Standards Unpad
- Academic Guidelines, all programs under review
- SOP Number 027/UPM-FMIPA/2021, Semester Learning Plan
- Learning in Virtual Environment Unpad (LIVE Unpad): https://reguler.live.unpad.ac.id/
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

In its self-assessment report, Unpad records that appropriate didactical instruments and methods are implemented for the programs under review. Each course may utilise one or a mix of different teaching methods, depending on the type of instruction: lectures, responses and tutorials, seminars, experiments, studio or workshop practices, fieldwork, and advanced research activities. Doctoral students, in particular, are required to disseminate their research at national or international seminars and publish their findings in reputable international journals.

The teaching staff at Unpad uses a Semester Learning Plan to document the instruments and methods for a course in accordance with the University and Higher Education learning process standards. Blended learning and electronic/online/offline learning (e-learning) are both acceptable learning methods. The Bachelor's and Master's programs utilise the learning management system (LIVE Unpad) for learning and teaching processes, especially for supporting blended learning.

The university's approach to learning is student-centred and involves teaching methods that prioritise the student's involvement in the learning process. Government regulations and internal curricula have recently focused on increasing problem-based and project-based learning. This approach helps students collect and analyse data, problem-solve, and present research results in laboratory and field settings. The Independent Learning-Independent Campus (MBKM) policy has been integrated into the Bachelor's curriculum to give students more flexibility in achieving their goals. With MBKM, students can learn from

different institutions, industries, and communities, allowing for a more student-centred approach to education. Furthermore, the availability of laboratory facilities, including education, research, advanced labs, and field labs, will enable students to conduct independent research.

Moreover, the Faculty of Mathematics and Natural Sciences works on exposing all students to relevant external parties through seminars by industry experts, internship offers, and partnerships with national and foreign institutions.

The four programs have courses on research methodology. Depending on their academic level, these courses guide students in developing, writing, and publishing papers, theses, and dissertations. To prevent plagiarism, an anti-plagiarism software subscription is used. **However, the experts strongly emphasise that when thesis work is based on experimental data, plagiarism detected by a software is usually a minor problem. They stress the critical importance of supervisors overseeing data collection, implementing appropriate controls, and handling data effectively (e.g., statistics, image selection and image enhancement).**

In the discussions with students, the experts learn that they are generally satisfied with the quality of teaching and learning in the programs under review.

In summary, the expert group considers the range of teaching methods and instruments suitable to support the students in achieving the intended learning outcomes. They confirm that the study concepts of all programs under scrutiny comprise a variety of teaching and learning forms as well as practical parts adapted to the respective subject culture. Finally, they attest that the imparting of academic research skills is sufficiently ensured.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 1:

The experts thank the University for the provided statements and additional documentation concerning criterion 1.

(ASIIN 1.1) Expansion of career options - Master's program in Biology

The audit team acknowledges and values the plan to address this issue as part of the 2024 revision of the Biology Department curriculum. Given that this action is forthcoming, the experts reaffirm their recommendation.

(ASIIN 1.1) Development of technical and non-technical skills and attitudes - Bachelor's and Master's programs

The experts commend the University's recognition of the importance of providing students with both technical and non-technical skills and attitudes, with a specific focus on resilience

(including research and scientific practices, handling failure, entrepreneurship, and economics). They acknowledge that plans are in place for various initiatives to be implemented. Because the results of these efforts will be apparent in the near future, the experts maintain their recommendation. They hope that the effectiveness of these efforts in addressing these areas of development will be evaluated.

(ASIIN 1.3) Attention to the names of the specializations - Bachelor's program in Biology

The experts appreciate the ongoing discussions about changing the name of the concentration of expertise in "Bioscience" to be equivalent to the level of "Applied Microbiology" and "Environmental Biology". They take note of the process of changing the nomenclature of "Bioscience", either to a new name or to separate into several divisions (such as Biosystematics, Biofunctions, and Biomolecule). Considering that this is an ongoing discussion and no actions have yet been taken, the experts retain their recommendation.

(ASIIN 1.3) Modern technologies and research concepts - Bachelor's and Master's programs in Biology

The experts recognise the efforts to review the course modules in the Bachelor's and Master's programs in Biology to update their content along with the development of knowledge and technology both in theory and practical skills. However, as these measures have not yet been implemented, the experts maintain the initial requirement, emphasising the importance of an action plan with expected milestones and timelines.

(ASIIN 1.3) Organisation of practical work in separate modules - Bachelor's and Master's programs in Biology

After reviewing the response from the Biology programs, the audit team acknowledges that the Bachelor's program already has practical work as a separate course. However, for the Master's program, practical activities are still integrated into the theoretical courses. Changes will be made in the next curriculum revision so that practical work will have its own modules. As a result, the experts maintain their recommendation for the Master's program.

(ASIIN 1.3) Biomolecular Health and Food Sciences courses – Master's program in Biology

The experts are pleased that the University is contemplating offering the Biomolecular Health and Food Sciences courses in the Master's program in Chemistry to students in the Master's program in Biology. However, as the availability of the Biomolecular Health and Food Sciences courses for biology students is expected in the near future, the experts stand by their original recommendation.

(ASIIN 1.5) Workload in the third semester - Bachelor's program in Biology

The audit team appreciates that the university recognises the heavy workload facing students during the third semester. They take note of the planned adjustments and

distribution of the courses and their practical work to balance this semester's workload. They also note that this will be one of the main topics for curriculum revision, which is planned to be held in September 2024. However, as no actions have been undertaken, the experts maintain their initial recommendation.

(ASIIN 1.5) Workload-adequate credit point system – Master's programs

The experts take note of the new regulation No. 53/2023 from the Ministry of Education and Culture, which increases the number of credits for master's programs to 72 credits (equivalent to 130.32 ECTS). They appreciate that, based on this change, non-credited activities will now be incorporated into the credits awarded to students. However, since the changes have not yet been implemented, the experts reiterate the need for the University to ensure that the study programs establish a credit point system that accurately reflects the workload, including for non-credit courses.

(ASIIN 1.5) Formal and systematic monitoring of the actual student workload – Bachelor's and Master's programs

The experts commend the University's plan to formalize the regular monitoring of workload in each semester. They also appreciate the University's plan to analyse the results of questionnaires and make necessary adjustments based on the findings. Furthermore, they are pleased that the University acknowledges the importance of this process in confirming whether credits have been allocated appropriately in relation to the associated workload. Since this is a plan for the near future, the experts emphasise the critical importance of ensuring that the programs establish formal and systematic monitoring of the actual student workload and verify the credits awarded.

(ASIIN 1.5) Lab work and Thesis – Doctoral program in Chemistry

The audit team appreciates the additional information provided by the Faculty regarding thesis work and laboratory experiments. Having reviewed this information, the team concludes that no further details are required at this time.

(ASIIN 1.5) Workload-adequate credit point system – Doctoral program in Chemistry

The experts note that, in line with the new regulations from the Ministry of Education and Culture, non-credit activities will be recognised as credited in the Doctoral program. However, since these changes have not yet been implemented, the experts reiterate the importance of the University ensuring that the study programs establish a credit point system that accurately reflects the workload, including for activities that are currently non-credit.

(ASIIN 1.6) Plagiarism prevention – all programs

The team take notes of the initiative to improve the process and outcome through the preparation of a standard operational procedure and the implementation of appropriate controls and effective data handling. These will be added to the Research Methodology and Academic Writing course in due course. However, as these changes have not been implemented yet, the experts emphasise the need for the university to ensure a change in its efforts to prevent plagiarism by moving to more general rules for good scientific practice.

The experts consider Criterion 1 to be partially fulfilled.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- Self-assessment report
- Module descriptions, all programs under review
- Educational handbook, all programs under review
- Unpad Academic Calendar 2023/2024: https://biologi.unpad.ac.id/en/kalender-akademik/
- Learning Assessment Manual Standard Universitas Padjadjaran
- Student portal: https://students.unpad.ac.id/
- Samples of student's work (projects, exams and thesis)
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

i. Forms of Examinations and Exam Schedule

According to the self-assessment report, formative and summative assessments evaluate students' academic performance.

Exams and the corresponding assessment rubrics measure students' learning outcomes (knowledge, attitudes, and skills competencies) according to a predefined grading scale reference. The module handbook specifies the course's intended learning outcomes (CLO) and identifies the types of examinations used to assess the achievement of these learning objectives. As described below, various assessment methods are used in the programs,

which can be performed as scheduled (i.e. mid-term and final exams) and flexible assessments in the form of structured tasks.

Table 5: Exam types in BPB, MPB, MPC, and DPC
Source: Self-assessment report, Unpad.

Program	Exam Format	Couse Sample
BPB	Written test, presentation	Theoretical course
	Written test, oral test, group work	Practical course
	Log book, work-based procedures, presentations, progress and final reports	Internship course
	Presentation, exhibition	Project-based course
	Seminar, scientific writing, oral examination	Final Project
MPB and MPC	Summative quiz, case-analysis, mid-term and final exams, and/or oral test	Theoretical course
	Log book and practical report	Practical report (only MPC)
	Scientific writing and/or publications	Scientific writing and/or publications
	Seminars of research proposals and results, Master thesis	Thesis
DPC	Seminar and optional conference presentation	Dissemination and skills Development
	Scientific writing and publication	Scientific publication
	Seminar and doctoral Thesis	Dissertation

Regarding the information on exam types, they specifically focus on the *Bachelor Program in Biology* and the various examination formats. While the diversity of examination types is appreciated, the expert panel, in line with the assessment in Criterion 1.5, believes that the workload associated with the exams should be carefully integrated into the credit point system.

Information about exam types and schedules is written in the Semester Learning Plan and Learning Contract, which are informed to students in the first session of each course. The form and length of each exam are specified in the course description available to the students via the university´s Learning in Virtual Environment (LIVE Unpad). Through the latter, lecturers can conduct quizzes and examinations and provide feedback on assessments. The students also learn about mid-term and final exams via the academic calendar. Mid-term examinations typically occur during the eighth-ninth week, with final examinations in the sixteenth.

The experts confirm that all examinations and their conduct across the different qualification levels are governed by a range of university regulations and standard operating procedures.

The study programs enable students to engage in activities outside the institution, such as internships for MBKM courses, research projects conducted in partner institutions for final projects, and student community service (KKN) courses. Concerning the assessment of students' internships, the experts see evidence that students are required to document any soft and technical skills they have obtained and submit a final report. Assessment is made

in collaboration between the students' host company internship supervisor and a staff member responsible for the internship from the University's side.

The assessment team reviewed a sample of exams/assignments and noticed that students received very general and, in some cases, vague or even arbitrary feedback on their responses, making it challenging to know what was wrong or right. During their exchanges with the team, the students acknowledged that lecturers are approachable so that they can meet with them to clarify the given points. However, the students also expressed their wish for more detailed feedback upon receiving their marks to understand specific areas for improvement. Based on the evidence gathered, the experts believe that the *Bachelor's and Master's programs* must mandate that lecturers provide constructive feedback in the written evaluation of the exams.

ii. Grading and Graduation Requirements

The final grade of each module is a combination of the scores of the individual types of assessment. The exam grade is presented in an absolute numeric value with a range of 0-100. The final grade of the course is given as a quality letter and quality score as follows: A (>=80); B (68-< 80); C (56-< 68); D (45-< 56); and E (<45, fail). Each grade will be converted into a quality score: 4.00, 3.00, 2.00, 1.00, and 0.00, respectively. The minimum grade required to pass all courses:

1. **BPB**: grade D (equal to a score of 1.00)
2. **MPB, MPC, and DPC**: Grade B (equal to a score of 3.00)

Students with failing grades must take a remedial exam or course. Students with grades C, D, or E may also consider retaking the course in the next semester. The score used for students who take the remedial exam is considered the last final score. The conditions for re-sit exams and accommodations for students with disabilities are specified in the academic regulations.

Students are required to attend a minimum of 80% of lectures and 100% of practical sessions to be allowed to take the final examination. However, if students face exceptional circumstances, such as emergencies, hospitalisation, or bereavement, which prevents them from sitting for midterms or final exams, they may be eligible to take a follow-up exam. The lecturer or Faculty will determine the time for the makeup exam, and students must provide suitable evidence to support their request.

Final grades are available on students' academic accounts no later than 2 weeks after the last exams. When students have objections to their exam results, they have the chance to appeal directly to the concerned lecturer within two days after the time of announcement

of the grade. The students confirmed that an appeal mechanism exists if they perceive their grades as unfair.

In order to graduate from the programs under review, students must have:

1. **BPB**: completed the required 144 credits with a minimum GPA of 2.75 without any E grades and a D mark not exceeding 20% of the total credits taken.
2. **MPB and MPC**: completed the required credits with a minimum GPA of 3.00, a minimum quality score of B for the research proposal seminar, publication as first author in a reputable national journal or conference proceeding, and no grade scores below C for the courses.
3. **DPC**: completed the required credits with a minimum GPA of 3.00, a quality score of A or B and papers published in reputable international journals (Q3)

In terms of proposal and thesis seminars, if Master's and Doctoral students must achieve a minimum score of 68. Failure to meet this score requires them to re-sit the failed seminar. Failing this second chance results in an inability to proceed with their studies.

Unpad has a policy on academic integrity in all student activity, including examinations and assignments. According to the "Student Code of Ethics", if students engage in plagiarism, they will face sanctions that correspond to the severity of their actions. To help prevent plagiarism, the university offers teachers and students access to anti-plagiarism software, which can be used to check for similarities in written work. **However, as noted in Criterion 1.6, it is of critical importance to transition to more general rules for good scientific practice including prevention of plagiarism.**

iii. Thesis

In accordance with academic guidelines, Bachelor's, Master's and Doctoral students are required to complete a research project as their final assignment before graduation. This project involves creating and presenting a research proposal, conducting research, analysing and interpreting data, and writing a thesis. After finishing the research and thesis writing, students must defend their thesis in front of a panel of examiners, which includes their supervisors and two internal examiners for Bachelor's programs and three examiners for the Master's programs.

Further discussion concerning the Doctoral program is provided in section D 4 of the "Additional Criteria for Doctoral Programs".

In their assessment of this criterion, the expert group finds that appropriate rules and regulations, which govern the examination systems university-wide, are in place. These rules and regulations are adequately communicated and transparently published. The

students also confirm during the audit that they are well-informed about the examination schedule, form, and grading rules. Additionally, they are given sufficient time to prepare for the exams adequately.

The expert group also examined a selection of final theses and determined that they were of an appropriate academic level.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 2:

The experts thank the University for the provided statements and additional documentation concerning criterion 2.

(ASIIN 2) Workload associated with exams – Bachelor's program in Biology and Feedback in the written evaluation of the exams – Bachelor's and Master's programs

The experts acknowledge the University's response and note that the program will revise the Standard Operating Procedures (SOP) for assessment. This includes detailed scoring for each assessment component and alignment with course learning objectives. Additionally, the University plans to arrange the SOP for lecturers regarding feedback correction on student exams and assignments.

However, it remains unclear how these measures address concerns related to the workload associated with exams in the Bachelor's program in Biology. Therefore the experts maintain their recommendation that the workload for exams be accurately reflected in the credit point system.

Furthermore, the experts are uncertain whether the proposed SOP adjustments will effectively support the need for constructive feedback. Consequently, they uphold their initial requirement and urge the University to ensure that lecturers provide meaningful and actionable feedback in their written evaluations of exams.

(ASIIN 2) Plagiarism prevention – all programs

Addressed under Criterion 1.

The experts consider Criterion 2 to be partially fulfilled.

3. Resources

Criterion 3.1 Staff and Staff Development

Evidence:

- Self-assessment report
- Staff handbooks and lecturer profiles, all programs under review
- Unpad recruitment website: https://recruitment.unpad.ac.id/
- Unpad's Guidelines for implementation of lecturer performance incentives (Feb 2021)
- Discussions during the audit

Preliminary assessment and analysis of the experts:

i. Staff

At Unpad, the staff members have different academic positions. There are professors, associate professors, assistant professors and lecturers. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. In addition, the responsibilities and tasks of a staff member concerning teaching, research, and supervision depend on the academic position.

Based on the self-assessment report, the **BPB** program has a total of 34 teaching staff members. This includes 7 full professors (21%), 11 associate professors (32%) and 16 assistant professors (47%). The **MPB** program has 13 teaching staff members, including 6 full professors (46%), 6 associate professors (46%) and 1 assistant professor (8%).

The University also provides information on the academic staff for the Chemistry programs. The **MPC** program consists of 19 teaching staff members, including 12 professors (63%), 5 associate professors (26%) and 2 assistant professors (11%). While the **DPC** program is staffed by a total of 16 teaching members, comprising 14 professors (88%) and 2 associate professors (12%).

The Indonesian government has set specific staff-student ratios for universities, which are outlined in the Ministry of Education, Culture, Research and Higher Education's regulation. The ideal ratio of staff to active students is 1:20 - 1:30. Currently, the **BPB** has a ratio of 1:13.7, while the **MPB** has a ratio of 1:2.6. The ratio at the **MPC** stands at 1:1.9, whereas at the **DPC**, it is 1:2.7.

The expert team confirms that the ratio of lecturers to students is adequate to fulfil the current needs of the four programs. They commend the University for upholding this standard and hope that this can be maintained.

The academic staff at Unpad mainly comprises permanent full-time civil servants appointed by the Ministry of Education and Culture. However, based on evaluations of adequacy, workload and formation needs, the University can open opportunities for individuals to be appointed as non-civil servant permanent staff. There are opportunities for foreign lecturers to be appointed as adjunct professors or through the High-Quality Talent route. Both schemes aim to increase international faculty members, enhance the quality and quantity of international publications, achieve an ideal lecturer-to-student ratio, and attract young talents to drive scientific development and strengthen Unpad's academic and international reputation.

The recruitment process is centralised at the university level. Minimum academic requirements include a Doctoral degree for lecturer positions and a Bachelor's degree for administrative staff roles. The expert panel appreciates the university's approach to attracting new academic staff.

Regarding promotion, lecturers who are public servants must follow the system regulated by the government. The teaching staff's promotion to a higher academic position is based on several factors, such as achievement in teaching, research, and community service activities (Tridharma Perguruan Tinggi). In order to be promoted to the position of a full professor, the applicant must hold a doctoral degree and demonstrate robust scientific production.

ii. Job Conditions and Performance Review of Staff

According to the University's relevant policy, lecturers are required to sign a Lecturer Individual Performance Contract (KKID) at the beginning of each semester, which states work goals and performance achievement in the so-called Tridharma (teaching, research and community service). The average realisation of the standard workload for all activities is 12-14.35 credits, while for the excess workload, it is 15-20 credits. Staff's excess workload is rewarded using a remuneration system in the form of points that are converted into incentives.

Unpad has established evaluation methods based on staff performance targets in the three Tridharma categories. Every semester, the university staff are required to report on the Realization of Individual Staff Performance (RKID) via their account on the staff portal (https://staff.unpad.ac.id). The head of the department is responsible for approving the performance documents submitted by the department staff. The lecturer's activities in the

field of research and other activities are approved by the Vice Dean, followed by the Dean's approval.

Additionally, the department's quality assurance team evaluates the staff every semester regarding subject-specific qualifications and didactics. These evaluations focus on the alignment of learning outcomes and course objectives with the examination methods. As outlined under Criterion 5, compulsory course evaluations are submitted by the students for each course. As confirmed by the program coordinators during the audit, the outcomes of these evaluations contribute to the overall staff assessment.

In terms of research, academic staff of the degree programs under review conduct their research projects collaboratively in research groups. Most research projects are supported by grants from the university, the government, private companies, and international institutions. The students are reportedly involved in research activities in order to support the completion of their final projects. Some researchers are also engaged in collaboration with other domestic and overseas universities as well as research centres and other institutions specifically for industry-related research. The academic staff is requested to disseminate research results at national and international conferences and publish them in reputable national and international journals. Staff members who have demonstrated exceptional accomplishments are rewarded.

iii. Staff Development

The formal recognition of the quality of academic staff within the study programs is achieved through the 'Certification of Lecturers', which is a process overseen by the government in accordance with Regulation No. 37/2009 on Lecturers.

To support this process, Unpad offers a range of training opportunities. The Teaching and Learning Innovation Center is responsible for improving the quality of education and teaching provided by the University. The Center offers programs designed to enhance pedagogic skills, such as PEKERTI for junior lecturers and the Applied Approach (AA) for all lecturers. Another area of training is the use of online learning media such as e-learning and Live Unpad, as well as writing teaching materials. Additionally, academic staff can improve their skills through degree and non-degree training programs from Indonesian universities and abroad.

Financial resources are available for staff members to go abroad for a limited time and to participate in conferences or other events to stay up to date with the scientific development in their area of expertise. In addition, the Faculty promotes the internationalisation process at Unpad by hosting international scientific events and inviting international guest lecturers.

The experts discuss the opportunities to develop their skills with the members of the teaching staff and learn that the teachers are satisfied with the internal qualification program at Unpad. This provides them opportunities to improve their didactic abilities, spend time abroad to attend conferences and participate in workshops and seminars.

In their appreciation of this criterion, the experts come to the following conclusions:

In the experts' opinion, the teaching staff's composition, scientific orientation and qualification are suitable for successfully implementing and sustaining the programs under review.

During the discussions with the assessment team, the lecturers confirmed that a range of professional development opportunities are available. The experts appreciate the University's efforts to support teaching staff in developing their skills and positively highlight the required teaching certification.

All in all, teaching staff expressed satisfaction with their working conditions for the Tridharma activities and professional development chances and exhibited a strong commitment to their students. **However, a concern raised was that alongside Tridharma activities, lecturers are expected to undertake administrative duties, potentially leading to an overload. Addressing this concern, the experts recommend for the four programs reducing administrative tasks to mitigate their negative impact on scientific outputs (Tridharma).**

As regards the students, they are equally satisfied with the approachable, enthusiastic, and motivated teaching staff as well as with the learning environment.

Criterion 3.2 Funds and equipment

Evidence:

- Self-assessment report
- University website: https://www.unpad.ac.id/
- List of projects with external funding, all programs under review
- List of collaborators, all programs under review
- Visitation of participating institutes and laboratories, Sumedang (Jatinangor) campus
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

i. Funding

According to the self-assessment report, the Faculty of Mathematics and Natural Sciences secures funding from two primary sources: 35% from the Indonesian government, allocated through salaries and government assistance, and 65% from other sources such as student tuition fees, research grants, Tridharma collaborations, and business units.

As discussed with the program coordinators, there is basic funding for operational activities consisting of teaching, laboratory work, research, community service, and other routine tasks. Realising that the Faculty needs more funding to run the Tridharma activities, in addition to tuition fees, the Faculty developed some strategies to diversify funding, including: a) proposing research grants to the government as well as industries, b) offering training services, and c) offering service for sample analysis. These become revenue-generating activities that increase financial earnings for the faculty.

The experts also learned that the research groups in Faculties collaborate to secure research funding from various sources. These funds support research activities that involve undergraduate and master's students in their final projects. The experts appreciate the involvement of students and particularly commend the personal initiative of research groups to acquire international funding.

ii. Collaborations

As part of its self-assessment report, a list of local and international collaborators was presented. The Faculty has collaboration with industries, universities, and other institutions at national and international levels to support the implementation of the curriculum and Tridharma activities. The collaborators attending the discussion during the site visit expressed satisfaction with their partnership with the University. This was further demonstrated by their willingness to participate in the accreditation meeting and the extension of the collaboration periods. In connection with this, the experts highlight the teaching staff's motivation for research and openness to and success in international collaboration.

iii. Infrastructure and technical equipment

During the audit, the expert group visited the following Jatinangor campus' facilities in order to assess the quality of infrastructure and technical equipment:

Table 6: Visited facilities at Jatinangor Campus
Source: Unpad

Bachelor and Master Biology	Master and Doctor Chemistry
Kandaga Library	

Bachelor and Master Biology	Master and Doctor Chemistry
1. Central Laboratory - Laboratory of Biological Activity 2nd Floor 2. D6 Building - Laboratory of Applied Microbiology 3. Laboratory of Pharmaceutical Service Innovation (PUIPT) 4. D2 Building - Laboratory of Biosystematics and Molecule (1st floor) - Laboratory of Structure and Function (1st floor) - Laboratory of Environmental Biology (1st floor) - Teaching Laboratory (2nd floor)	1. Central Laboratory - Laboratory of Chemical Analysis 1st floor - Laboratory of Natural Product Chemistry 2nd floor - Laboratory of Organic Synthesis 3rd floor 2. D5 Building - Laboratory of Material Chemistry 1st floor - Laboratory of Analytical Chemistry 2nd floor

In their appreciation of the quality of infrastructure and equipment, the experts come to the following conclusions:

The central laboratory is equipped adequately to support research activities for lecturers and students from the **BPB, MPB, MPC**, and **DPC**. The facilities are modern and well-maintained. During the visit, the lab was busy with students and staff and appeared well-used.

The Department of Biology provides a teaching laboratory with standard equipment. In addition to the teaching laboratories, there are some small laboratories to conduct specific activities such as Tissue culture, Microbial culture and Tissue processing. The Biology Department also has QRealtime PCR, a Graded PCR Fluorescence microscope, software for protein docking, and a good-standard animal house.

Animal facilities appeared well organised and clean. Staff and students seemed well-trained and knowledgeable of animal handling and ethical treatment. Facilities for animal dissection and microscopic work are good. It appeared that the facilities are being well-used by students and researchers.

The expert group offers the following specific observations:

- It is unclear if DNA sequencing capability is available as it was not shown during the visit. However, in-house sequencing facilities are not required since commercial companies can do it better and cheaper. There were conflicting statements regarding the location of sequencing: some indicated DNA is sent to Singapore, Japan, or Malaysia, while others mentioned there are now reliable companies in Indonesia.
- Good clean benches are available for sterile work. However, the experts note that small oil lamps, rather than Bunsen burners, are used for sterile work. These small “candles” are not sufficiently hot for sterility, which may ruin some experiments.

- There are good qPCR machines that appear to be used, but it is unclear how frequently. Given that qPCR is expensive and many groups from medicine and pharmacy use the equipment, the assessment team requests clarification regarding their utilisation by the biology groups.
- The microbiology lab was (except for a few incubators) empty but clean. It is unclear whether basic equipment (pipettes, shakers, centrifuges etc.) is sufficient to run courses in the bachelor and master programs. There are no state-of-the-art gas burners for semi-sterile work at the benches. There are miniature stools instead of the common high chairs to sit on during work, which may be inconvenient for professional lab work.

In terms of quality, the available equipment and facilities are sufficient to support research activities. Should the equipment become a limitation, the institution has arranged several approaches such as resource sharing, collaborate with other universities and industries, and finding grant for procurement of equipment. The audit team specifically noted the benefits of accessing the governmental lab in Jakarta, which makes up for the lack of high-tech equipment.

In terms of quantity, additional equipment units are needed to enhance students' hands-on experience and improve their laboratory skills. Although the central lab appears to be fairly well funded, basic training for B.Sc. and M.Sc. students is (and should be) carried out in the departments. These teaching labs are insufficiently equipped. The step from the insufficiently funded basic training to scientific work in the central lab is really high. It will require additional courses to learn how to operate "real" scientific equipment. During the discussions with the assessment team, the teaching staff also acknowledged the need for more equipment. Therefore, the team requires increasing the standard equipment for *the Bachelor's program in Biology,* specifically gas burners, centrifuges, pipettes, water-bath/heating blocks, shakers, and spectrophotometer. Similarly, for both the *Master's programs in Biology and Chemistry*, the experts see the need for a higher number of medium-cost, more specialised equipment.

The experts believe that suggested improvements would better guarantee the sustenance of the programs under review in the future. Apart from that, the experts appreciate that the aspects of safety are well-taught and instructed, highlighting the good practices in introducing a safety procedure in anticipating earthquakes and fires. This policy is legalised by the Rector's regulation No 45, year 2016, concerning Technical guidelines for orders, security, and safety environment at Unpad.

Furthermore and recognising that this extends beyond Unpad's scope of action, the panel strongly recommends initiating proactive dialogue between the university administration

and the Indonesian government regarding potential shortcomings that could significantly endanger accreditation prospects in the long term, including:

- Funding is insufficient for excellence in scientific output. Although the government has increased science funding, Indonesia (0,25% of GDP) is still far behind Malaysia (1,25% of GDP) and Singapore (2,2% of GDP).
- Duration of grants (usually 1 year) does not allow for significant and sustainable research projects. Comparatively, research grants in Germany run for 3 years and, with promising outcomes, can be extended for another 3 years.

iv. Supporting resources for staff

Lecturers can apply for staff exchange abroad involving research and publication, being a guest lecturer or reviewer. Lecturers usually go to universities that have a Memorandum of Understanding (MoU) with Unpad or a Letter of Agreement (LoA) with the Faculty. Lecturers have been sent to partner universities in countries such as the Japan, Malaysia, Thailand and Germany. In terms of research, funding is obtainable through various sources, including the University, government, and national and international institutions.

The University provides support for lecturers to disseminate the results of their research through the Directorate of Research and Community Services. Asked by the experts, the teaching staff confirmed the existence of service units dedicated to assisting with paper and proposal writings. Unpad's support for research and publication is well-recognised by teaching staff.

v. Supporting resources for students

As mentioned previously, Unpad utilises a learning management system called "LIVE Unpad," providing students access to lectures, course materials, and interactions with lecturers. Additionally, Unpad employs an integrated academic information system called "SIAT," which allows students to access all their academic information, including course contracts, schedules, scholarships, and academic performance. During the auditors' interactions with students on-site, the students expressed their satisfaction with these online platforms

Every student is assigned to an academic advisor lecturer who is responsible for student activities from beginning to end. The academic advisors can monitor students' performance online through the academic portal SIAT. The students confirmed during the discussion with the expert group that they all have an academic advisor, that they meet regularly, and that they can always contact their advisor personally and ask for help or advice.

Besides the above, students can rely on an early introductory program at the start of their studies, as well as on several dedicated support units, such as the Library, Dental Hospital, Teaching Hospital, E-learning Center, Language Center and Career Development Center. Additionally, there are various events and developmental programs available for students to participate in outside of the classroom, including student organisations and clubs.

The experts attest that there is a good and trustful relationship between the students and the teaching staff; enough resources are available to provide individual assistance, advice and support for all students. The support system helps students adjust to the university environment, achieve the intended learning outcomes and complete their studies successfully. The students are well-informed about the services available to them.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 3:

The experts thank the University for the provided statements and additional documentation concerning criterion 3. They specifically value the "List of equipment to be purchased (2024-2026)" provided as an attachment. As noted in the evaluation report, safety aspects are well-taught and instructed at Unpad. In this context, the experts explicitly acknowledge the inclusion of further safety equipment e.g., chemical cabinets, in the faculty's investment plan (attachment).

(ASIIN 3.1) Administrative tasks and impact on scientific outputs – all programs

The experts appreciate that the University is considering reducing the administrative workload of the teaching staff. The University plans to optimise the use of the integrated academic system by providing technical guidance to the education personnel. However, since the outcomes of these efforts are expected in the near future, the experts uphold their initial recommendation

(ASIIN 3.2) Increase in the provision of standard equipment - Bachelor's program in Biology

The experts commend the University for compiling a list of standard equipment scheduled for acquisition from 2024 to 2026 by the Department of Biology. This initiative is seen as a crucial step towards improving the quality of education and resources available to students in the Bachelor's program. The experts request the prompt implementation of this procurement plan as it will enhance the overall service and educational experience for the Bachelor's students.

(ASIIN 3.2) Increase in the Provision of medium-cost, more specialised equipment – Master's program in Biology and Chemistry

The experts also thank the University for developing a detailed list of medium-cost, more specialized equipment to be purchased between 2024 and 2026 by the Department of Biology and the Department of Chemistry. The experts strongly recommend the prompt execution of this procurement plan to ensure timely improvements in the program's resource quality.

The experts consider criterion 4 to be mostly fulfilled.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Self-assessment report
- Unpad website: https://www.unpad.ac.id/en/
- Faculty Mathematics and Natural Sciences website: http://fmipa.unpad.ac.id
- Module descriptions, all programs under review

Preliminary assessment and analysis of the experts:
The module descriptions for the programs under review were provided as appendices to the self-assessment report. According to the ASIIN criteria, the module descriptions should be accessible to all students and teaching staff and contain the following:

- module title
- person(s) responsible for each module
- teaching method(s)
- credits and work load
- intended learning outcomes
- module content
- admission and examination requirements
- form(s) of exams and details explaining how the module mark is calculated
- recommended literature
- date of last amendment

Upon completing registration, freshmen students are provided with the respective module handbooks which are also accessible through the programs' website.

The experts note that the module descriptions are all competence-oriented. Yet, in many cases, they lack descriptions of content. They also note that the recommended literature

is very outdated. In connection with Criterion 1.3, lecturers should update their literature to ensure they can effectively teach modern methods. The experts ask the University to revise the module description for the Bachelor's and Master's programs, ensuring they comply with the ASIIN Criteria for the Accreditation of Degree Programmes.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-assessment reports
- Sample Transcript of Records, all programs under review
- Sample Diploma/Degree Certificate, all programs under review
- Sample Diploma supplements, all programs under review

Preliminary assessment and analysis of the experts:
According to the information provided in the self-assessment report, students from the programs under review receive after graduation a Diploma Certificate, accompanied by an Academic Transcript. The issuance of Diploma certificates is the university's authority and is signed by the Rector and Dean of the Faculty of Mathematics and Natural Sciences, according to the Minister of Education and Culture Regulation No. 81 of 2014.

Along with these documents, the graduates receive a Diploma Supplement, which is an official statement letter issued by the Faculty of Mathematics and Natural Sciences. It contains all necessary information about the degree program, including learning outcomes, acquired soft skills and student achievement in academic, co-curricular, extracurricular, or non-formal education.

The ASIIN experts are provided with samples of these documents. The experts confirm that the students of the degree programs under review are awarded a Diploma Certificate, as well as a Transcript of Records and a Diploma Supplement. The Transcript of Records lists all the courses the graduate has completed, the achieved credits, grades, cumulative GPA, and the seminar and thesis title.

Criterion 4.3 Relevant Rules

Evidence:

Self-Assessment Report

- Self-assessment report
- All relevant regulations as presented in the self-assessment report

Preliminary assessment and analysis of the experts:

The auditors confirm that the rights and duties of both Unpad and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence available to all relevant stakeholders. In addition, the students receive all relevant course material in the language of the degree programs at the beginning of each semester.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 4:

The experts thank the University for the provided statements and additional documentation concerning criterion 4.

(ASIIN 4.1) – Revision of the module descriptions - Bachelor's and Master's programs

The assessment team appreciate the University's plan to revise content description and update the literatures in the module handbook. However, since no actions have been implemented, the team highlights the need for a thorough revision. They ask the University to comprehensively update the module descriptions, addressing issues such as insufficient content details, outdated literature, and insufficient support for modern methods.

In line with these revisions and plans outlined in response to Criterion 3.2, **the experts believe that updating the reading recommendations for the modules needs to be accompanied by a general update of the library's resources, especially textbooks.**

The experts consider that criterion 4 is yet to be fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- LAMSAMA Accreditation Certificate, Bachelor and Master Biology, Master Chemistry
- BAN-PT Accreditation Certificate, Master Biology and Chemistry, Doctor Chemistry
- Samples of Customer (Student) Satisfaction Survey reports, 2022
- Samples of Lecturer and supporting staff satisfaction survey report, 2020-2022
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

Universitas Padjadjaran and the Faculty of Mathematics and Natural Sciences present a comprehensive system of external and internal quality assurance. This system has been institutionalised in line with Government regulations and is periodically evaluated and updated. Quality assurance processes at Unpad are overseen by the university-level Quality Assurance System (SPM) and the faculty-level Quality Assurance Unit (UPM). At the department or study program level, quality assurance is managed by the Quality Control Group (GKM).

Based on Unpad Quality Policy, the study programs undergo internal screening processes employing student surveys, lecturer performance assessments and data obtained from external stakeholders through tracer study and labour market observation.

According to the self-assessment report, students offer input on the teaching and learning process, lecturers' qualifications and competency, and teaching facilities through the Integrated Academic and Information System (SIAT). This is end-of-semester feedback that the students must submit in order to access their final grades. In case the satisfaction of the students with staff members is deficient, the matter will be discussed in the annual semester meeting of the department. The Head of the Study Program will contact the respective teacher, discuss the issue and propose solutions. The experts had access to the Customer (Student) Satisfaction Survey report for 2022.

Asked about how students are informed about the evaluation results, the program coordinators explained to the experts that student representatives are involved in the Board of Trustees. Moreover, a summary of the results is made accessible to the students. Therefore, they are aware of the evaluation reports. Thus, the assessment team agree that the quality management circles at Unpad are well-established and work under participation of all stakeholders.

In addition, annual tracer studies are conducted to gather information about graduates, utilising the University's Career Development Centre system (https://karier.unpad.ac.id/site/index). Lecturers and supporting staff also complete a questionnaire on SIAT at the start of each semester. The insights from these surveys are utilised to drive continuous improvement at both the departmental and program levels.

The existence of such evaluation instruments was confirmed by program coordinators, students and lecturers of the respective programs during the audit. Reportedly, the Faculty also consistently holds meetings with students every semester to directly gather their feedback.

In the discussion with the experts, the alumni confirmed that tracer studies exist, and the industry representatives also confirmed that the university is open to receiving feedback about new developments and trends that could enhance the employability of its graduates.

Aside from such internal quality assurance mechanisms, recurring external quality assurance exercises at Unpad and the Faculty are related to the legal obligation to submit every degree program for national accreditation in addition to the compulsory institutional accreditation. The Bachelor's program in Biology and Mater's program in Chemistry have attained the status of "excellent" by LAMSAMA, while the Master's program in Biology has obtained the status of "very good" by the same agency. The Doctoral program in Chemistry have attained the highest accreditation level, designated as "excellent" by BAN-PT.

Overall, the expert panel has a positive impression of the quality assurance system for the programs under review. Quality management has a high priority within the university, and various functioning structures have been created in this regard. They consider Unpad and the Faculty of Mathematics and Natural Sciences to conduct a sufficient number of evaluations to survey the opinions of students, stakeholders, and staff on a regular basis. **However, as discussed under Criterion 1.5, the team did not find any evidence of a questionnaire inquiring about student workload for both Bachelor's and Master's programs. The team believes that these results should be also incorporated into the continuous development of the programs under review.**

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 5:

The experts thank the University for the provided statements and additional documentation concerning criterion 5.

(ASIIN 5) Formal and systematic monitoring of the actual student workload – Bachelor's and Master's programs - Bachelor's and Master's programs

Addressed under Criterion 1.

The experts consider criterion 5 to be mostly fulfilled.

D Additional Criteria for Structured Doctoral Programs

Criterion D 1 Research

Evidence:

- Self-assessment report
- Samples of student dissertations and publications
- Discussions during the audit.

Preliminary assessment and analysis of the experts:
As outlined under section B, the Doctoral Program in Chemistry at Unpad aims to qualify for research in the area of Chemistry, with a focus on the development of science and technology, and community welfare.

To this end, students of the program are encouraged to conduct and disseminate research with intra-, inter-, and multi-disciplinary approaches that pursue the application of Chemistry concepts. In agreement with this, doctoral students informed the assessment team during the audit that their dissertations cover a wide range of topics within the research domains of the Department of Chemistry. The department is organised into four research groups: Functional Material Chemistry, Analytical Chemistry and Separation, Natural Product Chemistry and Synthesis, and Biomolecular Health, Food, and Protein Chemistry.

All in all, the expert panel sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 1

In the absence of further comments or relevant additional evidence by the University, the experts confirm their above preliminary assessment and see this criterion as fulfilled.

Criterion D 2 Duration and Credits

Evidence:

- Self-assessment report
- Guidelines for Organizing Doctoral Study Programs within the Faculty of Mathematics and Natural Science, Padjadjaran University (January 2022)

- Discussions during the audit.

Preliminary assessment and analysis of the experts:
The Doctoral program in Chemistry consists of a minimum of 42 Indonesian credits (*Satuan Kredit Semester*, SKS).

i. Structure of the Program

The expected study duration is six semesters (3 years) with student intake in August each year. In regard to the maximum duration, Unpad implements a limit of seven years (14 semesters) in line with government regulations. An extension of the study period may be granted only under special circumstances.

Doctoral candidates are required to engage in research and publication throughout their period of study and have to complete certain courses during the first year of the program. The initial stage involves doctoral qualification and developing the research proposal. The total number of credits a student completes depends on prior research and academic background, as well as the research topic.

Doctoral students confirmed during the audit that the workload is manageable, allowing them to maintain a balance between studies and other commitments.

ii. Contents

The cumulative study load for the Doctoral program consists of the following:

1. Doctoral Qualification Competencies with a minimum number of 12 credits;
2. Research Proposal Session (5 credits);
3. Research Result Session (5 credits);
4. Dissertation Manuscript Review 6 credits;
5. Publication of Scientific Articles in reputable International Journals 9 credits; and
6. Doctoral Promotion Session (SPD) 5 credits

The Doctoral Qualification Competencies (12 credits) consist of basic research skills (5 credits), knowledge dissemination/development skills (5 credits), and career development skills (2 credits). Students can take the components of knowledge dissemination/development skills and career development skills at other universities and institutions.

All in all, based on the provided documentation and their discussions during the audit, the expert group attests that modules within the doctoral program serve to achieve the intended academic qualification. Through the offered structure, students are able to individualise their doctoral journey. The expert panel thus sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 2:

In the absence of further comments or relevant additional evidence by the University, the experts confirm their above preliminary assessment and see this criterion as fulfilled.

Criterion D 3 Soft Skills and Mobility

Evidence:

- Self-assessment report
- List of collaborators, Doctoral program
- Student mobility, Doctoral program
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

Doctoral candidates are offered a wide range of opportunities for their personal and professional development and take advantage of institutional support for career development and mobility. Two courses in the DPC foster personal and professional development a) career development skill and b) basic research skill. **Regarding the designation of "basic research skills", the experts ask the University to clarify why this cluster in the learning model for a doctoral-level program is not referred to as "advanced research skills".**

Most students entering the program are employed as lecturers and researchers, positions they will resume after completing their doctoral studies. For those who are not currently employed, support is available through Unpad's Career Development Centre.

As part of their studies, doctoral students are exposed to a number of industry, guest lectures as well as networking events with the aim of fostering their research capacities and publication skills.

To support student mobility, students are also given opportunities to collaborate with partner institution. Examples include Osaka University, Chiba University, RIKEN Wako Campus, and RIKEN Yamagata Campus in Japan, Universiti Pendidikan Sultan Idris, Universiti Kebangsaan Malaysia, Universiti Sains Malaysia in Malaysia, and Rheinland-Pfälzische Technische Universität in Germany. These activities have been facilitated through grants from national institutions like DIKTI and BRIN, as well as international institutions such as DAAD and RIKEN.

All in all, the expert panel sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 3:

The experts thank the University for the provided statements and additional documentation concerning criterion D 3

(D 3) Module basic research skills – Doctoral program in Chemistry

The experts acknowledge that according to Rector Regulation No. 38/2021, the Indonesian term for the course is "Keterampilan Penelitian Dasar," which translates literally to "Basic Research Skill" in English. However, given that the course content predominantly involves advanced research activities, they recommend referring to the module as "Advanced Research Skills" to better reflect its level and focus.

Apart from the above, the expert panel sees this criterion as fulfilled

Criterion D 4 Supervision and Assessment

Evidence:

- Self-assessment report
- Learning Process Evaluation report, Doctoral program in Chemistry 2020/2021
- Guidelines for Organizing Doctoral Study Programs within the Faculty of Mathematics and Natural Science, Padjadjaran University (January 2022)
- Sample Academic Transcript
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

At the doctoral level, modules, as well as research work, are graded on a letter grade scale as displayed below:

Table 7: Course Grading System
Source: Sample Academic Transcript doctoral program, Unpad.

Grade	Score	Meaning
A	4	Excellent
B	3	Good
C	2	Fair
D	1	Poor
E	0	Fail
L	-	Pass by RLP

The final scientific work in the DPC is a dissertation. This work is based on research results and follows scientific methods and principles. The final scientific work can only be compiled after the student has had one published publication and two other draft publications that have been submitted. **Regarding this quantitative requirement, the experts request that the University clarify the measures in place to ensure the quality of publications and prevent the fragmentation of research into multiple papers in lower-tier journals. They strongly believe that adjustment to more realistic publication requirements are needed with more emphasis on quality than on quantity.**

For their dissertation, doctoral students receive guidance from a so-called Promoter Team, comprised of 1 promoter chairman and 1 promoter member. Additionally, an Examination Team (Expert Opponent Team, consisting of 2 Unpad lecturers and 1 outside Unpad, and 1 Representation of Unpad Professors) are tasked with providing a comprehensive assessment of the student's academic performance, by submitting questions and rebuttals. Evaluations of the final scientific work are divided into the forms of research proposal seminar, scientific article, research results seminar, dissertation manuscript study, and doctoral promotion session.

The *research proposal seminar* serves as a student's dissertation research plan, providing an open scientific forum for attendance by both students and lecturers. On a scoring range of 0 – 100, the passing threshold for the research proposal seminar is A (≥ 80)/B (68-79). If a student fails the seminar twice, they cannot continue their studies. During the research process, students write three *scientific articles* that are in accordance with dissertation research. The *research results seminar* is a forum attended by both students and lecturers, held after students have conducted research in the context of preparing a dissertation. The pass grade limit for the research results seminar is the same as or above 68. The *dissertation manuscript* that has been completed and approved by the promoter team is submitted for further study by the reviewers. Students are entitled to advance to the doctoral promotion session if the average final score is at least 68. Finally, the *doctoral promotion session* critically assesses the entire dissertation by the examiners.

All in all, the expert panel sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 4:

The experts thank the University for the provided statements and additional documentation concerning criterion D 4

(ASIIN D 4) Ensuring quality of publications – Doctoral program in Chemistry

The experts acknowledge that under Rector Regulation No. 38/2021, students were required to publish one paper and submit at least two papers to quartile 1 and 2 Scopus-indexed journals in order to achieve Grade A. However, Permendikbudristek No. 53/2023, which will be effective in 2025, shifts the focus to quality. The experts appreciate that the new regulation does not have specific quantitative requirements, allowing departments to prioritize submissions to high-tier journals rather than the number of publications. Based on this explanation, the experts see no need to issue a recommendation in this regard.

The expert panel sees this criterion as fulfilled

Criterion D 5 Infrastructure

Evidence:

- Self-Assessment Report
- Library website: https://lib.unpad.ac.id
- Visitation to research labs.

Preliminary assessment and analysis of the experts:
As highlighted by the University in its self-assessment report and during the audit, doctoral students can draw from a range of facilities to support their timely graduation, including dedicated workspaces, research labs, as well as library access to books, journals, and anti-plagiarism checkers.

The audit team visited the facilities provided for doctoral students at the Jatinangor campus to evaluate the infrastructure and technical equipment. As indicated under criterion 3.2, the experts judged the available equipment and facilities as sufficient to support research activities.

All in all, the expert panel sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 5:

In the absence of further comments or relevant additional evidence by the University, the experts confirm their above preliminary assessment and see this criterion as fulfilled.

Criterion D 6 Funding

Evidence:

- Self-Assessment Report
- List of collaborators, Doctoral program
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

Funding for research is accessible through multiple sources, including the university itself, research grants from the Indonesian government, or external organisations, the latter drawing from Unpad's network of industry partners. Further relevant aspects are discussed under criterion 3.2.

All in all, the expert panel sees this criterion as fulfilled.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 6:

In the absence of further comments or relevant additional evidence by the University, the experts confirm their above preliminary assessment and see this criterion as fulfilled.

Criterion D 7 Quality Assurance

Evidence:

- Self-assessment report
- Statistical data for the Doctoral program as part of the self-assessment report
- Guidelines for Organizing Doctoral Study Programs within the Faculty of Mathematics and Natural Science, Padjadjaran University (January 2022)
- Discussions during the audit.

Preliminary assessment and analysis of the experts:

Based on the data provided in the self-assessment report, the experts confirm that the university collects student progression data, including average study time, drop-out rates and GPA averages for each doctoral student cohort.

The experts attest that academic guidelines are provided to the doctoral students to support their doctoral journey. Furthermore, Unpad pursues a strict scientific integrity policy. Further relevant aspects are discussed under Criterion 5 and Criterion D 4.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion D 7:

In the absence of further comments or relevant additional evidence by the University, the experts confirm their above preliminary assessment and see this criterion as fulfilled.

E Additional Documents

Before preparing their final assessment, the experts ask for the following missing or unclear information together with the comment of the Higher Education Institution on the previous chapters of this report:

None

F Comment of the Higher Education Institution (02.08.2024)

The institution provided the following additional information:

- List of equipment to be purchased (2024-2026)
  - 1. Department of Biology (BPB & MPB)
  - 2. Department of Chemistry (MPC & DPC)

The institution also provided the following statement:

Criterion 1.1 Objectives and Learning Outcomes of a Degree Program (Intended Qualifications Profile)

In the draft report, on **p.9, line 26**, concerning the **Master's program in Biology's** graduate qualification profile, "*the expert team encourages the University to expand these career options. For example in Europe, biologists are well accepted in many fields even outside bio-science, including but not limited to patent offices, medicine, material sciences, IT, pharmacy, instrumentation, and counselling*".

Furthermore, on **p.10, line 10**, "*the assessment team identified an area for further improvement in the **Bachelor's and Master's programs**, particularly in the development of technical and non-technical skills and attitudes. The recommendation is to enhance students' skills, with a focus on resilience (including research and good scientific practice, handling failure, entrepreneurship and economics). This improvement is seen as important in preparing the students more comprehensively for their future careers*".

Response:

"We agree with the advice from the expert team regarding with expanding the career options for MPB. In response to the input from the expert team, we are going to follow up this issue as one of the agendas on the revision of the biology department curriculum as started soon in 2024. Thereafter, we prepare the courses to support these outcome profiles by encouraging universities to create a cross-faculty/study program lecture system, and to create interdisciplinary courses related to improve student capabilities in the fields of medicine, material sciences, IT, pharmacy, instrumentation, and counseling.

Regarding with preparing the students more comprehensively for their future careers, we agree that students should be equipped with technical and non-technical skills and attitudes, focusing on resilience (including research and good scientific practice, handling failure, entrepreneurship and economics).

1. For enhancing technical skills of the students, we will implement more practical skills as mandatory courses, either for Bachelor's or Master's programs.

2. For enhancing of non-technical skills focus on resilience for Master's programs, we are going to optimize on supervising processes by conducting regular meeting based on research group (e.g. twice a month), and progress report (every two months). We will also introduce courses related to entrepreneurship and industry in the new curriculum.
3. For enhancing of non-technical skills focus on resilience for BPB, we have university courses that meet the requirement, such as OKK/Creativity and Entrepreneurship, Religions, Civics, and Counselling services."

Criterion 1.3 Curriculum

On **p.13, line 15,** the assessment team recommended that the **Bachelor's program in Biology "***consider the names of the specializations as "Biosciences", "Environmental Biology", and "Applied Microbiology" are not at the same level of definition*".

In addition to that, on **p.14, line 23,** concerning the **Bachelor's and Master's programs in Biology**, the assessment team was under the impression that "*in the modules, there is no mention, for example, to modern biotechnology or environmental engineering. They believe these areas should be included in the curriculum, on both theoretical knowledge and practical skills, to adequately educate students on current technologies. The panel suggests that both programs need to update their content to reflect modern technologies and research concepts*".

On the **same page, line 28**, the assessment team also observed *"that in Chemistry, the practical courses and the lectures are separate modules but in Biology, practical courses are somehow integrated into the lectures. In the experts' opinion, this underestimates the importance of practical work in biological sciences and does not allow insights in sufficient depth. Therefore, for the* ***Bachelor's and Master's programs in Biology****, the organisation of the practical work in separate modules according to the Chemistry example would be beneficial*".

Furthermore, **on p.15, line 19**, it is stated that "*upon reviewing the Biomolecular Health and Food Sciences courses [Master's program in Chemistry advanced courses], the experts believe that these advanced courses should also be offered to students in Biology. They hold the strong opinion that integrating these courses could significantly improve the* ***Biology program*****"**.

Response:

"In response to the comment from the expert team about the terminology used to describe the specializations, BPB and MPB accept this comment and are discussing in changing the name of the concentration of expertise in the field of Bioscience to be equivalent to the level of the fields of Applied Microbiology and Environmental Biology. We are in the process of changing the nomenclature of "Bioscience", either to be a new name or separate into several divisions (such as Biosystematics, Biofunctions, and

Biomolecule). This issue will be brought and decided during the curriculum revision at the end of this year.

We agree with the response from experts about the need to incorporate modern knowledge and ensures that subjects are up-to-date and also about the need to separate between practical course and lecture modules.

1. The BPB and MPB are going to review the course modules to update the content along with the development of knowledge and technology both in theory and practical skills.
2. To reach the sufficient depth on the Biotechnology course, we are considering shifting this course into higher level in Master program along with its practical course. We are also planning to establish Environmental Engineering course in Master program along with its practical course.
3. In regards with the use of sharing facilities from other departments/laboratories, it will be explicitly written on the module handbook (practicum).
4. We would like to clarify that in BPB, we have already separated the practical work as a course, which can be seen in https://biologi.unpad.ac.id/en/struktur-mata-kuliah-s1/.
5. For MPB, practical activity is still integrated at the theoretical courses. Therefore, in the next curriculum revision, we are planning to allocate practical work courses separately so that they have their own modules.

We agree with the suggestion to offer the Biomolecular Health and Food Sciences courses in MPC to students in MPB. It is possible to make the Biomolecular Health and Food Sciences courses available for students in Biology."

Criterion 1.5 Workload and Credits

On **p.20, line 28**, the experts stated that "*there were concerns about the heavy workload in the third semester of the **Bachelor's program [in Biology]**, in terms of practicums and exam preparation. Recognising this concern, the assessment team believes there is a need for the program to evaluate the workload distribution during the third semester to ensure it is appropriately balanced*".

On **p 21, line 17,** "*the assessment team noted the inclusion of non-credited activities in the total ECTS calculation for the **MPB and MPC** curricula. In the MPB curriculum, the total ECTS amounts to 123.53, with 70.59 ECTs attributed to credited topics and 52.94 ECTs from non-credited activities. Similarly, the MPC curriculum totals 125.74 ECTs, comprising 68.78 ECTs from credited subjects and 56.96 ECTs from non-credited activities. The expert panel strongly believes that **both Master's programs** need to establish a workload-adequate credit point system (non-credited courses)*".

Moreover, on the **same page, line 26**, it is highlighted for **Bachelor's and Master's programs** that the experts "*did not find evidence confirming that it is regularly monitored whether the credits awarded for each module correspond to the actual student workload. Consequently, the panel asks that the University establish a formal and systematic monitoring of the actual student workload and verify the credits awarded*".

On **p.22, line 3, "***regarding the required credits in the **Doctoral program in Chemistry**, the experts request clarification from the University on whether there are any credits for the thesis work itself. Additionally, they seek clarification on the proportion of time students spend in the lab conducting experiments*".

In addition to that, **on the same page, line 7**, the experts noted that "*similar to the Master's programs, in the **Doctoral program in Chemistry** curriculum, the total ECTs is 184.82 as it is composed of 76.02 ECTs from credited subjects but also 108.8 ECTs from non-credited activities. The expert panel emphasises once again the need for both the Master's and Doctoral programs to establish a credit point system that appropriately reflects workload, including non-credited courses*".

On **p. 23, line 1**, the experts come to the conclusion that "*they were unable to verify at this stage whether credits have been allocated appropriately in accordance with the associated workload*".

Response:

"Concerning the credit awarded to students in 3rd semester of BPB, it is still in the range of maximum workload that is allowed by national regulation (Regulation of Ministry of Education and Culture of Indonesia No. 53/2023, maximum 24 SKS). In the 3rd semester, there are six courses and six practical works, which causes the student workload extremely heavy. Therefore, we will adjust and distribute the courses and their practical works so that the workload is balanced in its semester. This feedback from the expert's team will be one of our main topics for curriculum revision, which plan to be held on September 2024, emphasizing on course content and its adjustment in implementation.

In the present curriculum of MPB and MPC, there are some non-credited activities. However, according to the new Ministry of Education and Culture Regulation Number 53 Year 2023, number of credits for master's program are 72 credits that are equal to 130.32 ECTS. With the new regulation, we can accommodate the non-credited activities into credited awarded to students, which is now discussed by the study programs.

Currently, university already has a formal monitoring system (Quality Assurance System in all levels). The monitoring for the learning process and outcome, including monitoring the student workload and verifying the credit awarded, has been undertaken through questionnaire. However, the process is still need to be refined. We agree the experts' comments regarding the necessity of formal and systematic monitoring. Therefore, in the

future, the university will formalize the regular monitoring process in each semester, analyse the result of questionnaire and make adjustment to the workload. Through this process, we can confirm whether credits have been allocated appropriately in accordance with the associated workload.

In the DPC, presently, the thesis work and laboratory experiment are inserted in the following courses:

1. Research Proposal Seminar (5 credits)
2. Research Progress Seminar 1 (1 credit)
3. Research Progress Seminar 2 (1 credit)
4. Final Result Seminar (3 credits)
5. Dissertation Manuscript Evaluation 6 credits
6. Dissertation Defence (5 credits)
7. Scientific Publication (9 credits)

with laboratory experiments are non-credited activities.

With the new regulation (Ministry of Education and Culture Regulation Number 53 Year 2023), similar to master's programs, the non-credited activities can be accommodated as credited awarded to students."

Criterion 1.6 Didactics and Teaching Methodology

On **p.24, line 4**, the expert discussed about using anti-plagiarism software to prevent plagiarism, strongly emphasising that *"when thesis work is based on experimental data, plagiarism detected by a software is usually a minor problem. They stress the critical importance of supervisors overseeing data collection, implementing appropriate controls, and handling data effectively (e.g., statistics, image selection and image enhancement)".*

Response:

"We agree with the experts' comments about the way to prevent plagiarism through the critical importance of supervisors overseeing data collection, implementing appropriate controls, and handling data effectively. To ensure the quality, supervisors have already involved in overseeing and controlling the collected data through discussions with students. In order to improve the process and outcome, in the future, the university will prepare the standard operational procedure, which include regular scheduled meetings between supervisors and students.

In addition, the implementation of appropriate controls and effective data handling will be added in the course of Research Methodology and Academic Writing."

Criterion 2 Exams: System, concept and organization

On **p.25, line 11** of the draft report, the discussion specifically focused on the "***Bachelor Program in Biology*** *and the various examination formats. While the diversity of examination types is appreciated, the expert panel, in line with the assessment in Criterion 1.5, believes that the workload associated with the exams should be carefully integrated into the credit point system".*

In addition to that, on **p.26, line 3**, concerning their inspection of the sample of exams/assignments and discussion with students, the experts noted that "*students received very general and, in some cases, vague or even arbitrary feedback on their responses, making it challenging to know what was wrong or right. During their exchanges with the team, the students acknowledged that lecturers are approachable so that they can meet with them to clarify the given points. However, the students also expressed their wish for more detailed feedback upon receiving their marks to understand specific areas for improvement. Based on the evidence gathered, the experts believe that the* ***Bachelor's and Master's programs*** *must mandate that lecturers provide constructive feedback in the written evaluation of the exams".*

On **p.27, line 14** of the draft report, the expert panel reaffirmed once again that "*as noted in Criterion 1.6, it is of critical importance to transition to more general rules for good scientific practice to prevent plagiarism".*

Response:

"As the response to the experts regarding with assessment, program will revise the SOP of assessment, which will include scoring on each problem of assessment and assignment based on the course learning objective. Furthermore, program will arrange the SOP for the lecturer concerning the feedback correction to the students' exam and assignment.

As already mentioned in response for Criteria 1.6 about the preventive action to plagiarism, beside inserting the content of plagiarism and good scientific practice in the courses (Scientific Communication, Bioethics, Literation and Scientific Writing), programs will also optimize the rule of supervisor. To ensure the quality, supervisors have already involved in overseeing and controlling the collected data through discussions with students. Due to improvement of the process and outcome, the programs will prepare the SOP for regular scheduled meetings between supervisors, students, and research group. In addition to implement appropriate controls and effective data handling, the contents will be added in the course of Research Methodology and Academic Writing. Besides, submission papers have to be under agreement among supervisors which are proved by signatures."

Criterion 3.1 HR Resources, Staff Development and Student Support

On **p.30, line 31,** "*a concern raised was that alongside Tridharma activities, lecturers are expected to undertake administrative duties, potentially leading to an overload. Addressing*

*this concern, the experts recommend that the **four programs** reduce administrative tasks to mitigate their negative impact on scientific outputs (Tridharma)".*

Response:

"We agree with your suggestions about the possibility to reduce administrative tasks for staff. The administrative duties of staff related to governance and staffing have been carried out using an integrated academic system at the University level. However, its socialization and utilization in reducing administrative tasks are still lacking. Therefore, we will strive to optimize the utilization of the system by conducting technical guidance to the education personnel."

Criterion 3.2 Funds and equipment

On **p.33, line 14** of the draft report, it is stated that "*in terms of quantity, additional equipment units are needed to enhance students' hands-on experience and improve their laboratory skills. Although the central lab appears to be fairly well funded, basic training for B.Sc. and M.Sc. students is (and should be) carried out in the departments. These teaching labs are insufficiently equipped. The step from the insufficiently funded basic training to scientific work in the central lab is really high. It will require additional courses to learn how to operate "real" scientific equipment. During the discussions with the assessment team, the teaching staff also acknowledged the need for more equipment. Therefore, the team requires increasing the standard equipment for the **Bachelor's program in Biology**, specifically gas burners, centrifuges, pipettes, water-bath/heating blocks, shakers, and spectrophotometers. Similarly, for both the **Master's programs in Biology and Chemistry**, the experts see the need for a higher number of medium-cost, more specialised equipment".*

Response:

"We agree with your suggestion regarding with the needs on a higher number of medium-cost, more specialised equipment. We have and will do the procurement of teaching equipment both for the BPB, MPB, and MPC. The list of equipment that we will purchase are attached (Attachment 1)."

Criterion 4.1 Module Descriptions

On **p.35, line 27,** it came to the experts' attention that "*the module descriptions are all competence-oriented. Yet, in many cases, they lack descriptions of content. They also note that the recommended literature is very outdated. In connection with Criterion 1.3, lecturers should update their literature to ensure they can effectively teach modern methods. The experts ask the University to revise the module description for the **Bachelor's and Master's programs**, ensuring they comply with the ASIIN Criteria for the Accreditation of Degree Programmes."*

Response:

"As response to the experts note on descriptions of content, we will revise content description and update the literatures in the module handbook. Align with this revision, programs will conduct periodic workshop to evaluate the achievement on the course

implementation every semester, which also use the survey result from students and lecturers as consideration."

Criterion 5 Quality management: quality assessment and development

On **p.38, line 25**, it is highlighted once again that *"the team did not find any evidence of a questionnaire inquiring about student workload for both **Bachelor's and Master's programs**. The team believes that these results should be also incorporated into the continuous development of the programs under review"*.

Response:
"As responded in Criterion 1.5 about the absence of the evidence of the questionnaire results about student workload, we will do the survey, analyze the result, and incorporate it into the quality assurance system for continuous development of all programs."

D Additional Criteria for Structured Doctoral Programs

Criterion D 3 Soft Skills and Mobility

On **p.41, line 11**, the experts focused on the cluster "basic research skills" in the Doctoral program in Chemistry, asking "*the University to clarify why this cluster in the learning model for a doctoral-level program is not referred to as "advanced research skills*".

Response:
" Based on Rector Regulation Number 38 Year 2021, the Indonesian term for the course is "Keterampilan Penelitian Dasar" which literally translated to English as "Basic Research Skill". However, the content of the course consists of several advanced research activities. For example:

1. Workshop on research proposal writing with research proposal as expected output.
2. Workshop on literature review writing with review paper in reputable international journal as expected output.
3. Workshop on research methodology and scientific writing with research paper in reputable international journal as expected output.

Criterion D 4 Supervision and Assessment

On **p.42, line 13**, the experts requested "*that the University clarify the measures in place to ensure the quality of publications and prevent the fragmentation of research into multiple papers in lower-tier journals. They strongly believe that adjustment to more realistic publication requirements are needed with more emphasis on quality than on quantity*".

Response:

"Based on Rector Regulation Number 38 Year 2021, to ensure the quality of publication,

the regulation has required students to publish one paper and submit at least two papers in quartile 1 and 2 Scopus-indexed journals to get Grade A. If the students publish in Quartile 3 Scopus-indexed journal, the students will get Grade B. However, based on Permendikbudristek No. 53 year 2023 which will be implemented in 2025, there is no quantitative requirement for the published journals. It implies that DPC may force the students to submit one paper to the high tier journals. In this context, we emphasize on quality rather than quantity."

G Summary: Expert recommendations (20.08.2024)

Taking into account the additional information and the comments provided by the University, the experts summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Bachelor Biology	With requirements for one year	-	30.09.2030
Master Biology	With requirements for one year	-	30.09.2030
Master Chemistry	With requirements for one year	-	30.09.2030
PhD Chemistry	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 1.6, 2) Ensure a change in the efforts to prevent plagiarism to more general rules for good scientific practice, including having supervisors oversee data collection, implementing appropriate controls, and managing data effectively (e.g., statistics, image selection, and image enhancement).

For the Bachelor's and both Master's degree programmes

A 2. (ASIIN 1.5, 5) Ensure that the programs establish a formal and systematic monitoring of the actual student workload and verify the credits awarded.

A 3. (ASIIN 2) Ensure that the lecturers provide constructive feedback in the written evaluation of the exams.

A 4. (ASIIN 4.1) Ensure a comprehensive revision and update of the module descriptions, addressing the lack of content details, outdated literature, and insufficient support for modern methods.

A 5. (ASIIN 4.1, 3.2) Make sure that updating the reading recommendations for the modules is supported by a general update of the library's resources, particularly textbooks

For the Doctoral and both Master's degree programmes

A 6. (ASIIN 1.5) Ensure that the study programs establish a credit point system that appropriately reflects workload, including non-credited courses.

For the Bachelor's degree programme Biology

A 7. (ASIIN 3.2) Ensure improvement and increase in the number of standard equipment in the program as described in the evaluation report.

For the Bachelor's and Master's degree programmes Biology

A 8. (ASIIN 1.3) Ensure adjustment of outdated course content and corresponding literature to modern methods and scientific questions.

Recommendations

For all degree programmes

E 1. (ASIIN 3.1) It is recommended to reduce administrative tasks to mitigate their negative impact on scientific outputs (Tridharma).

For the Bachelor's and both Master's degree programmes

E 2. (ASIIN 1.1) It is recommended that the study programs enhance the development of students' skills, with a particular focus on resilience, including aspects such as research and good scientific practice, handling failure, entrepreneurship and economics.

For both Master's degree programmes

E 3. (ASIIN 3.2) It is recommended to increase the number of medium-cost, more specialised equipment.

For the Bachelor's degree programme Biology

E 4. (ASIIN 1.3) It is recommended that the study program consider the names of the specializations as "Biosciences", "Environmental Biology", and "Applied Microbiology" are not at the same level of definition.

E 5. (ASIIN 1.5) It is recommended that the program evaluate the distribution of the workload in the third semester to ensure it is appropriately balanced.

E 6. (ASIIN 2) It is recommended that the workload associated with the exams be carefully integrated into the credit point system.

For the Master's degree programme Biology

E 7. (ASIIN 1.1) It is recommended that the University expand the program's career options.

E 8. (ASIIN 1.3) It is recommended to organise practical work in separate modules according to the Chemistry example.

E 9. (ASIIN 1.3) It is recommended that advanced courses in the Master Chemistry be made available to students in Biology, such as Biomolecular Health and Food Sciences courses.

For the Doctoral degree programme Chemistry

E 10. (ASIIN D 3) It is recommended that the cluster "Basic Research Skills" be referred to as "Advanced Research Skills" in line with the requirements of a doctoral-level program.

H Comment of the Technical Committees (11.09.2024)

Technical Committee 09 – Chemistry, Pharmacy (06.09.2024)

Assessment and analysis for the award of the ASIIN seal:

The TC confirms that there is a particular need for improvement in the areas of academic work, student workload, module handbooks, credit allocation and course content. A total of eight requirements are to be imposed on these points. In addition, 10 recommendations are proposed by the expert group. The TC discusses the procedure and agrees with the proposed requirements and recommendations.

The Technical Committee 09 – Chemistry, Pharmacy recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Ma Chemistry	With requirements for one year	-	30.09.2030
PhD Chemistry	With requirements for one year	-	30.09.2030

Technical Committee 10 – Life Sciences (11.09.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee confirms that there is a particular need for improvement in the areas of academic work, student workload, module handbooks, credit allocation and course content. A total of eight requirements are to be imposed on these points. In addition, 10 recommendations are proposed by the expert group. The TC discusses the

procedure and, in summary, agrees with the proposed requirements and recommendations.

The Technical Committee 10 – Life Sciences recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2030
Ma Biology	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 1.6, 2) Ensure a change in the efforts to prevent plagiarism to more general rules for good scientific practice, including having supervisors oversee data collection, implementing appropriate controls, and managing data effectively (e.g., statistics, image selection, and image enhancement).

For the Bachelor's and both Master's degree programmes

A 2. (ASIIN 1.5, 5) Ensure that the programs establish a formal and systematic monitoring of the actual student workload and verify the credits awarded.

A 3. (ASIIN 2) Ensure that the lecturers provide constructive feedback in the written evaluation of the exams.

A 4. (ASIIN 4.1) Ensure a comprehensive revision and update of the module descriptions, addressing the lack of content details, outdated literature, and insufficient support for modern methods.

A 5. (ASIIN 4.1, 3.2) Make sure that updating the reading recommendations for the modules is supported by a general update of the library's resources, particularly textbooks

For the Doctoral and both Master's degree programmes

A 6. (ASIIN 1.5) Ensure that the study programs establish a credit point system that appropriately reflects workload, including non-credited courses.

For the Bachelor's degree programme Biology

A 7. (ASIIN 3.2) Ensure improvement and increase in the number of standard equipment in the program as described in the evaluation report.

For the Bachelor's and Master's degree programmes Biology

A 8. (ASIIN 1.3) Ensure adjustment of outdated course content and corresponding literature to modern methods and scientific questions.

Recommendations

For all degree programmes

E 1. (ASIIN 3.1) It is recommended to reduce administrative tasks to mitigate their negative impact on scientific outputs (Tridharma).

For the Bachelor's and both Master's degree programmes

E 2. (ASIIN 1.1) It is recommended that the study programs enhance the development of students' skills, with a particular focus on resilience, including aspects such as research and good scientific practice, handling failure, entrepreneurship and economics.

For both Master's degree programmes

E 3. (ASIIN 3.2) It is recommended to increase the number of medium-cost, more specialised equipment.

For the Bachelor's degree programme Biology

E 4. (ASIIN 1.3) It is recommended that the study program consider the names of the specializations as "Biosciences", "Environmental Biology", and "Applied Microbiology" are not at the same level of definition.

E 5. (ASIIN 1.5) It is recommended that the program evaluate the distribution of the workload in the third semester to ensure it is appropriately balanced.

E 6. (ASIIN 2) It is recommended that the workload associated with the exams be carefully integrated into the credit point system.

For the Master's degree programme Biology

E 7. (ASIIN 1.1) It is recommended that the University expand the program's career options.

E 8. (ASIIN 1.3) It is recommended to organise practical work in separate modules according to the Chemistry example.

E 9. (ASIIN 1.3) It is recommended that advanced courses in the Master Chemistry be made available to students in Biology, such as Biomolecular Health and Food Sciences courses.

For the Doctoral degree programme Chemistry

E 10. (ASIIN D 3) It is recommended that the cluster “Basic Research Skills” be referred to as “Advanced Research Skills” in line with the requirements of a doctoral-level program.

I Decision of the Accreditation Commission (06.12.2024)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure and agrees to incorporate adjustments in the proposed Requirement A6 and Recommendation E7.

Regarding the proposed Requirement A6, the Accreditation Commission decides to reword it to provide a more precise context for the condition. Additionally, the Accreditation Commission reconsiders the proposed Recommendation E7 and decides to exclude it from the list. As a result of these changes, there will now be a total of eight requirements and nine recommendations in place.

In all other aspects, the Accreditation Commission adopts the assessment from the experts and Technical Committees without any further changes.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Subject-specific label	Maximum duration of accreditation
Ba Biology	With requirements for one year	-	30.09.2030
Ma Biology	With requirements for one year	-	30.09.2030
Ma Chemistry	With requirements for one year	-	30.09.2030
PhD Chemistry	With requirements for one year	-	30.09.2030

Requirements

For all degree programmes

A 1. (ASIIN 1.6, 2) Ensure a change in the efforts to prevent plagiarism to more general rules for good scientific practice, including having supervisors oversee data collection, implementing appropriate controls, and managing data effectively (e.g., statistics, image selection, and image enhancement).

For the Bachelor's and both Master's degree programmes

A 2. (ASIIN 1.5, 5) Ensure that the programs establish a formal and systematic monitoring of the actual student workload and verify the credits awarded.

A 3. (ASIIN 2) Ensure that the lecturers provide constructive feedback in the written evaluation of the exams.

A 4. (ASIIN 4.1) Ensure a comprehensive revision and update of the module descriptions, addressing the lack of content details, outdated literature, and insufficient support for modern methods.

A 5. (ASIIN 4.1, 3.2) Make sure that updating the reading recommendations for the modules is supported by a general update of the library's resources, particularly textbooks

For the Doctoral and both Master's degree programmes

A 6. (ASIIN 1.5) Verify the students' total workload and award the ECTS points accordingly. All compulsory courses need to be credited.

For the Bachelor's degree programme Biology

A 7. (ASIIN 3.2) Ensure improvement and increase in the number of standard equipment in the program as described in the evaluation report.

For the Bachelor's and Master's degree programmes Biology

A 8. (ASIIN 1.3) Ensure adjustment of outdated course content and corresponding literature to modern methods and scientific questions.

Recommendations

For all degree programmes

E 1. (ASIIN 3.1) It is recommended to reduce administrative tasks to mitigate their negative impact on scientific outputs (Tridharma)

For the Bachelor's and both Master's degree programmes

E 2. (ASIIN 1.1) It is recommended that the study programs enhance the development of students' skills, with a particular focus on resilience, including aspects such as research and good scientific practice, handling failure, entrepreneurship and economics.

For both Master's degree programmes

E 3. (ASIIN 3.2) It is recommended to increase the number of medium-cost, more specialised equipment.

For the Bachelor's degree programme Biology

E 4. (ASIIN 1.3) It is recommended that the study program consider the names of the specializations as "Biosciences", "Environmental Biology", and "Applied Microbiology" are not at the same level of definition.

E 5. (ASIIN 1.5) It is recommended that the program evaluate the distribution of the workload in the third semester to ensure it is appropriately balanced.

E 6. (ASIIN 2) It is recommended that the workload associated with the exams be carefully integrated into the credit point system.

For the Master's degree programme Biology

E 7. (ASIIN 1.3) It is recommended to organise practical work in separate modules according to the Chemistry example.

E 8. (ASIIN 1.3) It is recommended that advanced courses in the Master Chemistry be made available to students in Biology, such as Biomolecular Health and Food Sciences courses.

For the Doctoral degree programme Chemistry

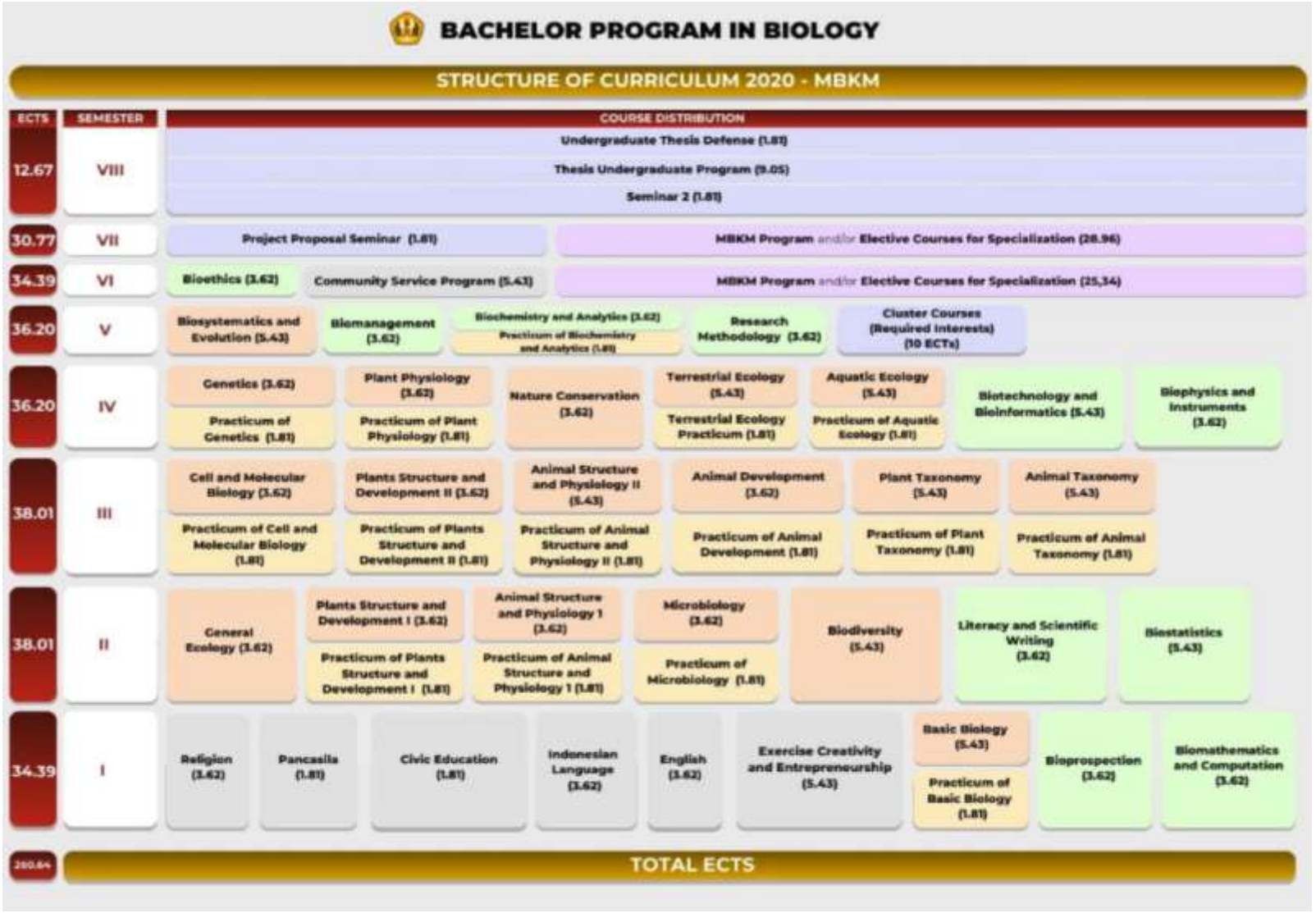
E 9. (ASIIN D 3) It is recommended that the cluster "Basic Research Skills" be referred to as "Advanced Research Skills" in line with the requirements of a doctoral-level program.

Appendix: Program Learning Outcomes and Curricula

The following **learning outcomes** and **curricular structure** are presented in the self-assessment report and the provided "Curriculum Documents":

Bachelor Biology

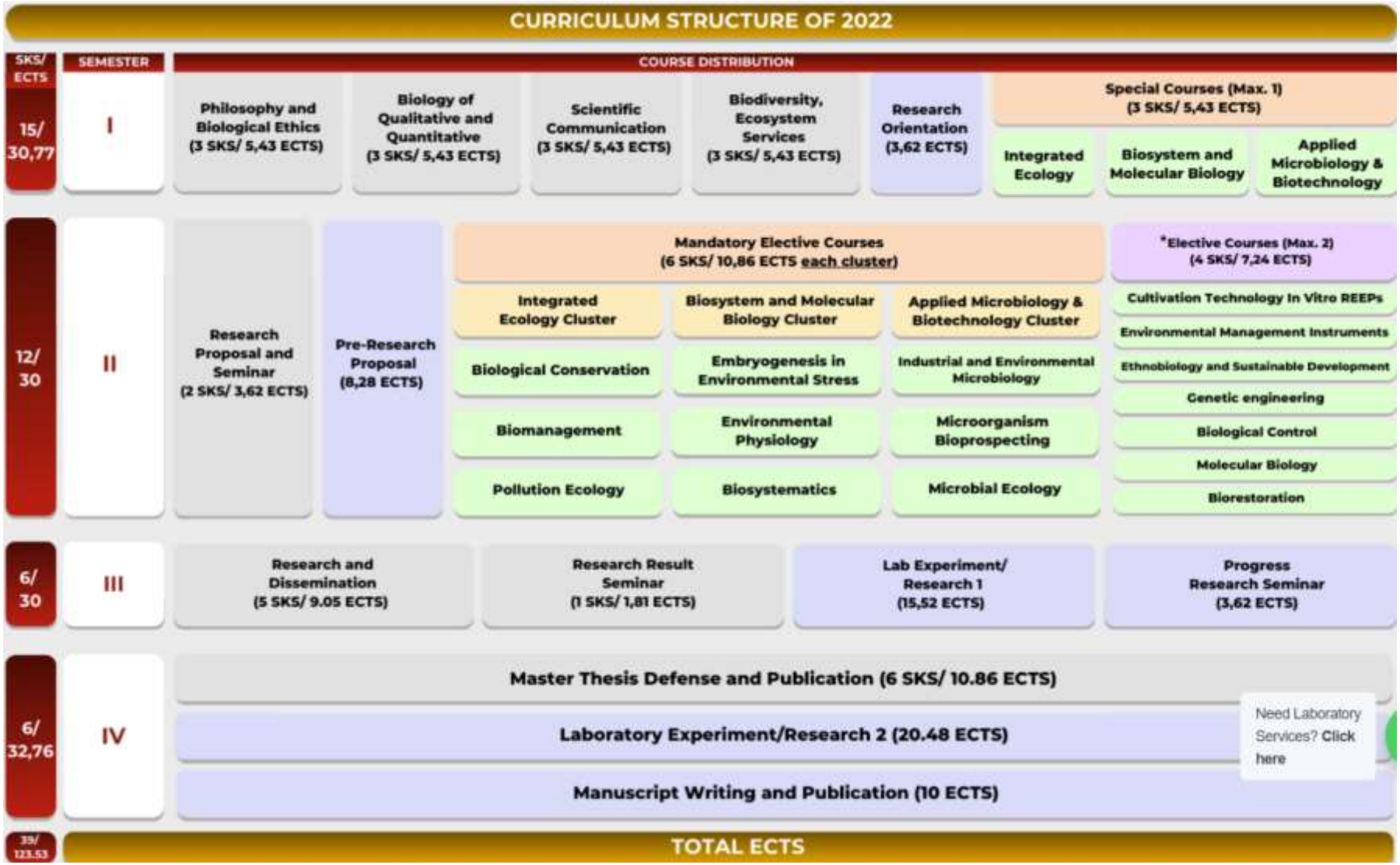
LO Number	Intended Learning Outcomes (ILO)
ILO-1	Able to develop a sense of togetherness, character, and contribute to the improvement of community life, nation, state, and the progress of civilization that is sustainable, based on values, norms, and academic ethics oriented towards RESPECT (responsibility, excellence, scientific rigor, professionalism, encouraging, creativity, trust).
ILO-2	Mastery of Biology concepts and methods and their application to support a profession in Biology.
ILO-3	Mastery of the principles of Biology in exploring and applying biological and environmental resources.
ILO-4	Able to learn multidisciplinary biological applications with the latest technology while developing strong character, leadership, and entrepreneurship.
ILO-5	Capable of applying logical, critical, systematic, and innovative thinking in the context of developing or implementing biological knowledge.
ILO-6	Able to make informed decisions based on data analysis and information in the context of solving biological problems.
ILO-7	Able to evaluate work results both independently and in groups.
ILO-8	Able to develop oneself by strengthening character, competence, data literacy, technological literacy, human literacy, and 21st-century soft skills that foster Higher Order Thinking Skills (HOTS).
ILO-9	Able to present alternative solutions to solve problems related to the sustainable management of biological and environmental resources through the application of relevant biological knowledge, methods, and technology as a basis for making informed decisions.
ILO-10	Able to apply Biology knowledge in daily life for the benefit of society.
ILO-11	Able to manage biological and environmental resources in a specific context.
ILO-12	Able to assess the needs of the community, taking into account local potential advantages, and implement biological knowledge for the benefit of society and industry.


BACHELOR PROGRAM IN BIOLOGY
STRUCTURE OF CURRICULUM 2020 - MBKM
ECTS
SEMESTER
COURSE DISTRIBUTION
12.67
VIII
Undergraduate Thesis Defense (1.81)
Thesis Undergraduate Program (9.05)
Seminar 2 (1.81)
30.77
VII
Project Proposal Seminar (1.81)
MBKM Program and/or Elective Courses for Specialization (28.96)
34.39
VI
Bioethics (3.62)
Community Service Program (5.43)
MBKM Program and/or Elective Courses for Specialization (25,34)
36.20
V
Biosystematics and Evolution (5.43)
Biomanagement (3.62)
Biochemistry and Analytics (3.62)
Practicum of Biochemistry and Analytics (1.81)
Research Methodology (3.62)
Cluster Courses (Required Interests) (10 ECTs)
36.20
IV
Genetics (3.62)
Practicum of Genetics (1.81)
Plant Physiology (3.62)
Practicum of Plant Physiology (1.81)
Nature Conservation (3.62)
Terrestrial Ecology (5.43)
Terrestrial Ecology Practicum (1.81)
Aquatic Ecology (5.43)
Practicum of Aquatic Ecology (1.81)
Biotechnology and Bioinformatics (5.43)
Biophysics and Instruments (3.62)
38.01
III
Cell and Molecular Biology (3.62)
Practicum of Cell and Molecular Biology (1.81)
Plants Structure and Development II (3.62)
Practicum of Plants Structure and Development II (1.81)
Animal Structure and Physiology II (5.43)
Practicum of Animal Structure and Physiology II (1.81)
Animal Development (3.62)
Practicum of Animal Development (1.81)
Plant Taxonomy (5.43)
Practicum of Plant Taxonomy (1.81)
Animal Taxonomy (5.43)
Practicum of Animal Taxonomy (1.81)
38.01
II
General Ecology (3.62)
Plants Structure and Development I (3.62)
Practicum of Plants Structure and Development I (1.81)
Animal Structure and Physiology 1 (3.62)
Practicum of Animal Structure and Physiology 1 (1.81)
Microbiology (3.62)
Practicum of Microbiology (1.81)
Biodiversity (5.43)
Literacy and Scientific Writing (3.62)
Biostatistics (5.43)
34.39
I
Religion (3.62)
Pancasila (1.81)
Civic Education (1.81)
Indonesian Language (3.62)
English (3.62)
Exercise Creativity and Entrepreneurship (5.43)
Basic Biology (5.43)
Practicum of Basic Biology (1.81)
Bioprospection (3.62)
Biomathematics and Computation (3.62)
280.64
TOTAL ECTS

Master Biology

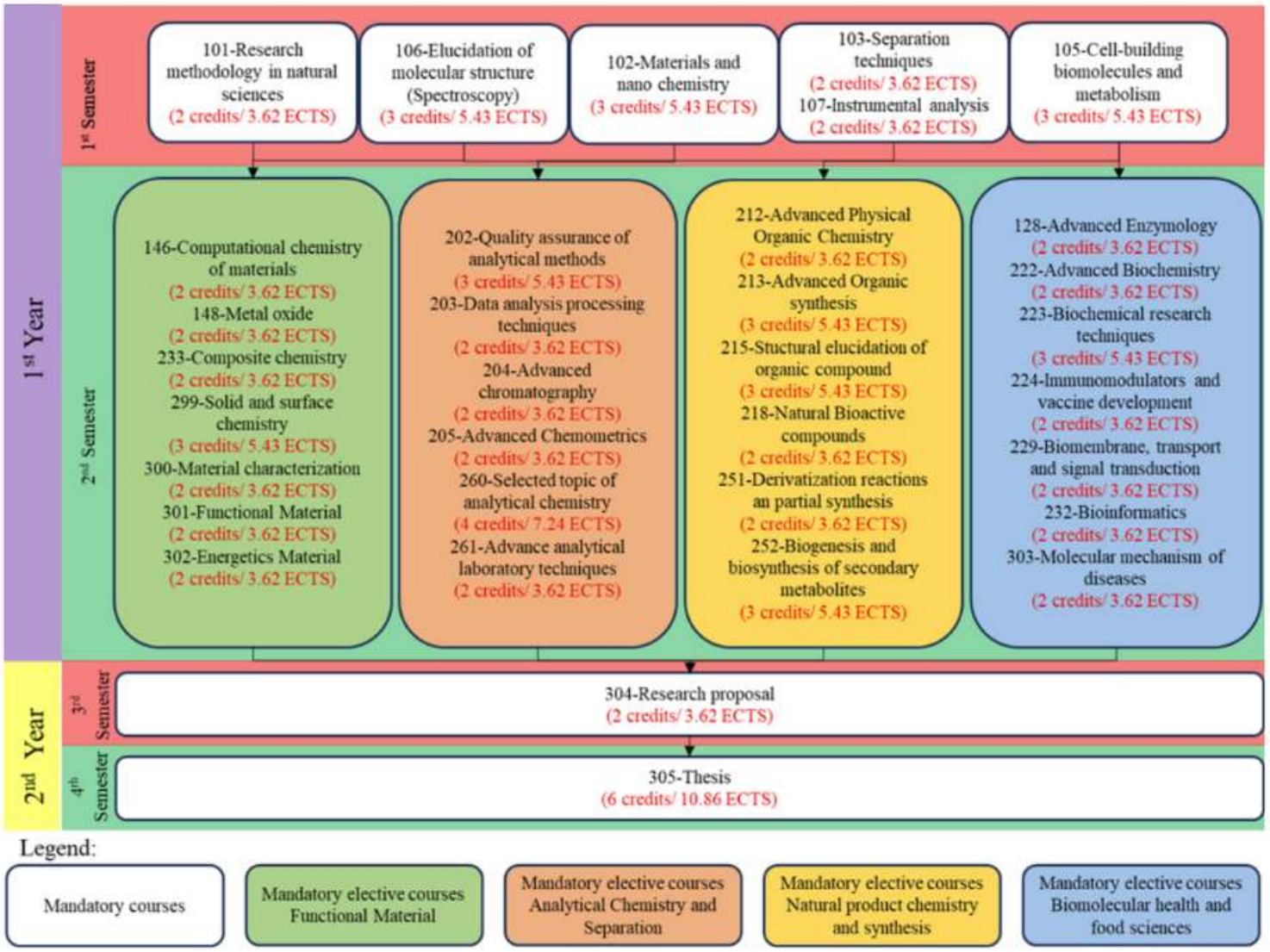
LO Number	Intended Learning Outcomes (ILO)
ILO-1	Demonstrate religious attitudes, morals, norms, able to internalize academic values, norms and ethics and show independent attitudes and culture, Responsible, Excellent, Scientific Rigor, Professional, Encouraging, Creative and Trust (RESPECT) and uphold human values and life.
ILO-2	Demonstrate academic mastery of Biology at all levels, beginning with cell and molecular biology, organisms, ecology, evolution, and the biosphere; mastering the concept of technology using cutting-edge instrumentation for biological resource analysis and synthesis; and mastering the concept of biodiversity for biological resource and environmental management for sustainability.
ILO-3	Understanding of measuring principles and concepts, as well as their application on advanced technology apparatus for biological resource analysis and synthesis.
ILO-4	Able to develop logical, critical, systematic, and creative thinking through scientific research, the creation of designs in the field of science and technology while considering and applying humanistic values, composing scientific concepts and research findings based on scientific principles, procedures, and ethics in the form of a thesis or equivalent form, as well as papers published in accredited scientific journals or accepted in international journals.
ILO-5	Attain skills and qualifications needed for employment in an academic, government, or private sector position related to the life sciences.
ILO-6	Able to deepen or expand biology science by producing accurate, tested, and innovative multidisciplinary models/methods/theory developments as applications and solutions for managing biological resources and the environment.
ILO-7	Ability to understand and be involved in solving climate change and global warming issues related to biodiversity and the environment.
ILO-8	Attain expertise in a specific field of study within one of three broad subject areas represented: Integrated Ecology, Biosystematic and molecular and Applied Microbiology.

Each elective can be chosen by all three areas of specialization.


CURRICULUM STRUCTURE OF 2022
SKS/ ECTS
SEMESTER
COURSE DISTRIBUTION
15/ 30,77
I
Philosophy and Biological Ethics (3 SKS/ 5,43 ECTS)
Biology of Qualitative and Quantitative (3 SKS/ 5,43 ECTS)
Scientific Communication (3 SKS/ 5,43 ECTS)
Biodiversity, Ecosystem Services (3 SKS/ 5,43 ECTS)
Research Orientation (3,62 ECTS)
Special Courses (Max. 1) (3 SKS/ 5,43 ECTS)
Integrated Ecology
Biosystem and Molecular Biology
Applied Microbiology & Biotechnology
12/ 30
II
Research Proposal and Seminar (2 SKS/ 3,62 ECTS)
Pre-Research Proposal (8,28 ECTS)
Mandatory Elective Courses (6 SKS/ 10,86 ECTS each cluster)
Integrated Ecology Cluster
Biosystem and Molecular Biology Cluster
Applied Microbiology & Biotechnology Cluster
Biological Conservation
Embryogenesis in Environmental Stress
Industrial and Environmental Microbiology
Biomanagement
Environmental Physiology
Microorganism Bioprospecting
Pollution Ecology
Biosystematics
Microbial Ecology
*Elective Courses (Max. 2) (4 SKS/ 7,24 ECTS)
Cultivation Technology In Vitro REEPs
Environmental Management Instruments
Ethnobiology and Sustainable Development
Genetic engineering
Biological Control
Molecular Biology
Biorestoration
6/ 30
III
Research and Dissemination (5 SKS/ 9.05 ECTS)
Research Result Seminar (1 SKS/ 1,81 ECTS)
Lab Experiment/ Research 1 (15,52 ECTS)
Progress Research Seminar (3,62 ECTS)
6/ 32,76
IV
Master Thesis Defense and Publication (6 SKS/ 10.86 ECTS)
Laboratory Experiment/Research 2 (20.48 ECTS)
Manuscript Writing and Publication (10 ECTS)
Need Laboratory Services? Click here
39/ 123.53
TOTAL ECTS

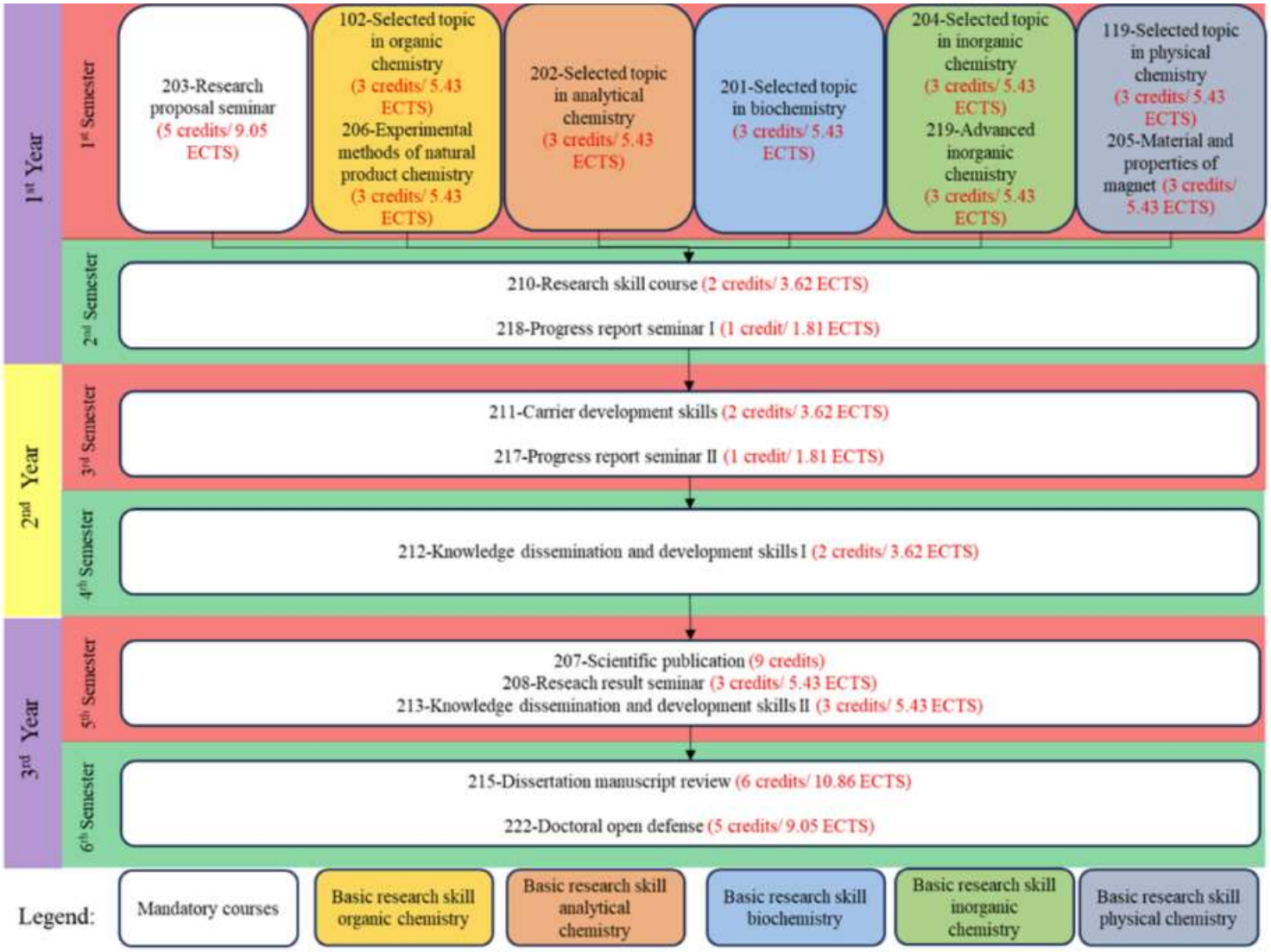
Master Chemistry

LO Number	Intended Learning Outcomes (ILO)
ILO-1	Internalize academic values, norms, and ethics.
ILO-2	Honest, disciplined, responsible, able to work together, respect the work of others and uphold scientific ethics.
ILO-3	Mastering the theoretical concepts of isolation, synthesis and/or characterization of biological and non-biological chemicals and environmental chemistry.
ILO-4	Mastering basic operational knowledge of instruments and/or software for data analysis and processing in the field of chemistry.
ILO-5	mastering the principles of chemical safety and security
ILO-6	Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology.
ILO-7	Able to demonstrate independent, quality, and measurable performance.
ILO-8	Able to collect and communicate research results.
ILO-9	Able to be responsible for the achievement of group work results, supervise and evaluate the completion of work assigned to workers who are under their responsibility.
ILO-10	Able to carry out self-evaluation process of work groups under their responsibility and able to manage learning independently.
ILO-11	Able to use instruments for isolation, characterization and/or synthesis of biological and non-biological chemicals as well as environmental chemistry.
ILO-12	Able to process data using software for molecular characterization or modelling.
ILO-13	able to carry out work and handle hazardous chemicals in accordance with occupational health and safety standards;
ILO-14	able to document, store, secure, and retrieve data to ensure its validity and prevent plagiarism as well as being able to communicate it orally and in writing.


1st Year
1st Semester
101-Research methodology in natural sciences
(2 credits/ 3.62 ECTS)
106-Elucidation of molecular structure (Spectroscopy)
(3 credits/ 5.43 ECTS)
102-Materials and nano chemistry
(3 credits/ 5.43 ECTS)
103-Separation techniques
(2 credits/ 3.62 ECTS)
107-Instrumental analysis
(2 credits/ 3.62 ECTS)
105-Cell-building biomolecules and metabolism
(3 credits/ 5.43 ECTS)
2nd Semester
146-Computational chemistry of materials
(2 credits/ 3.62 ECTS)
148-Metal oxide
(2 credits/ 3.62 ECTS)
233-Composite chemistry
(2 credits/ 3.62 ECTS)
299-Solid and surface chemistry
(3 credits/ 5.43 ECTS)
300-Material characterization
(2 credits/ 3.62 ECTS)
301-Functional Material
(2 credits/ 3.62 ECTS)
302-Energetics Material
(2 credits/ 3.62 ECTS)
202-Quality assurance of analytical methods
(3 credits/ 5.43 ECTS)
203-Data analysis processing techniques
(2 credits/ 3.62 ECTS)
204-Advanced chromatography
(2 credits/ 3.62 ECTS)
205-Advanced Chemometrics
(2 credits/ 3.62 ECTS)
260-Selected topic of analytical chemistry
(4 credits/ 7.24 ECTS)
261-Advance analytical laboratory techniques
(2 credits/ 3.62 ECTS)
212-Advanced Physical Organic Chemistry
(2 credits/ 3.62 ECTS)
213-Advanced Organic synthesis
(3 credits/ 5.43 ECTS)
215-Stuctural elucidation of organic compound
(3 credits/ 5.43 ECTS)
218-Natural Bioactive compounds
(2 credits/ 3.62 ECTS)
251-Derivatization reactions an partial synthesis
(2 credits/ 3.62 ECTS)
252-Biogenesis and biosynthesis of secondary metabolites
(3 credits/ 5.43 ECTS)
128-Advanced Enzymology
(2 credits/ 3.62 ECTS)
222-Advanced Biochemistry
(2 credits/ 3.62 ECTS)
223-Biochemical research techniques
(3 credits/ 5.43 ECTS)
224-Immunomodulators and vaccine development
(2 credits/ 3.62 ECTS)
229-Biomembrane, transport and signal transduction
(2 credits/ 3.62 ECTS)
232-Bioinformatics
(2 credits/ 3.62 ECTS)
303-Molecular mechanism of diseases
(2 credits/ 3.62 ECTS)
2nd Year
3rd Semester
304-Research proposal
(2 credits/ 3.62 ECTS)
4th Semester
305-Thesis
(6 credits/ 10.86 ECTS)
Legend:
Mandatory courses
Mandatory elective courses Functional Material
Mandatory elective courses Analytical Chemistry and Separation
Mandatory elective courses Natural product chemistry and synthesis
Mandatory elective courses Biomolecular health and food sciences

Doctoral Program in Chemistry

LO Number	Intended Learning Outcomes (ILO)
ILO-1	Demonstrating a responsible attitude towards work in their field of expertise independently.
ILO-2	Being honest, disciplined, able to work together, respect the work of others, able to work systematically, and uphold scientific ethics.
ILO-3	Mastering the philosophy/theory/concept of chemistry and its application in the field of natural product chemistry, biological and non-biological as well as environmental chemistry.
ILO-4	Mastering the principles and process of discovering novelty and originality in the field of science chemistry and its applications.
ILO-5	Mastering the principles of using chemical instruments and software for analysis data and information from the instrument in the field of chemistry and its applications.
ILO-6	Designing novelty/originality of a chemical scientific development and its application (novelty in principles, approaches and methods, as well as scopes), and compiling a comprehensive 'state of art'.
ILO-7	Designing and managing multi-, inter-, and transdisciplinary research related to chemistry and comprehensive application at the national/international level.
ILO-8	Being able to make appropriate decisions in the context of solving problems in the field of expertise based on the results of information and data analysis, and capable in documenting, storing, securing, and retrieving data to ensure validity and prevent plagiarism.
ILO-9	Compiling international standard dissertations and scientific publications that have theoretical and practical benefits, and are able to communicate both orally and in writing in national and international languages.
ILO-10	Designing and solving chemistry problems and their applications which are complex and interconnected through multi-, inter- and transdisciplinary research.
ILO-11	Organizing and leading a research effectively involving various disciplines of knowledge.
ILO-12	Being able to use software for analysis and synthesis in the field of chemistry in general or more specific (organic, biochemical, analytical, physical chemistry, or inorganic).
ILO-13	Being able to carry out work and handle hazardous chemicals in accordance with occupational safety and health standards, as well as being able to anticipate and reduce the impact of hazards on the use of chemical substances in community, environment, social and economic.
ILO-14	Being able to apply knowledge of chemistry in the field of chemistry of living and non-biological natural materials as well as environmental chemistry thus it is beneficial for community, environmental, social and economic life.


1st Year
1st Semester
203-Research proposal seminar (5 credits/ 9.05 ECTS)
102-Selected topic in organic chemistry (3 credits/ 5.43 ECTS)
206-Experimental methods of natural product chemistry (3 credits/ 5.43 ECTS)
202-Selected topic in analytical chemistry (3 credits/ 5.43 ECTS)
201-Selected topic in biochemistry (3 credits/ 5.43 ECTS)
204-Selected topic in inorganic chemistry (3 credits/ 5.43 ECTS)
219-Advanced inorganic chemistry (3 credits/ 5.43 ECTS)
119-Selected topic in physical chemistry (3 credits/ 5.43 ECTS)
205-Material and properties of magnet (3 credits/ 5.43 ECTS)
2nd Semester
210-Research skill course (2 credits/ 3.62 ECTS)
218-Progress report seminar I (1 credit/ 1.81 ECTS)
2nd Year
3rd Semester
211-Carrier development skills (2 credits/ 3.62 ECTS)
217-Progress report seminar II (1 credit/ 1.81 ECTS)
4th Semester
212-Knowledge dissemination and development skills I (2 credits/ 3.62 ECTS)
3rd Year
5th Semester
207-Scientific publication (9 credits)
208-Reseach result seminar (3 credits/ 5.43 ECTS)
213-Knowledge dissemination and development skills II (3 credits/ 5.43 ECTS)
6th Semester
215-Dissertation manuscript review (6 credits/ 10.86 ECTS)
222-Doctoral open defense (5 credits/ 9.05 ECTS)
Legend:
Mandatory courses
Basic research skill organic chemistry
Basic research skill analytical chemistry
Basic research skill biochemistry
Basic research skill inorganic chemistry
Basic research skill physical chemistry