ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Mechanical Engineering
Chemical Engineering
Materials and Metallurgical Engineering

Provided by
Institut Teknologi Kalimantan

Version: 12th of September, 2023

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Teknik Mesin	Mechanical Engineering	ASIIN	-	01
Teknik Kimia	Chemical Engineering	ASIIN	-	01
Teknik Material dan Metalurgi	Materials and Metallurgical Engineering	ASIIN	-	01, 05
Date of the contract: 04.04.2022 **Submission of the final version of the self-assessment report:** 18.10.2022 **Date of the onsite visit:** 01.03.2023 **at:** Institut Teknologi Kalimantan Campus, Balikpapan, Indonesia				
Expert panel: Prof. Dr. Gerd Bacher, University Duisburg-Essen Dr. Manfred Grueneberg, Ehrmann SE Prof. Dr. Andrea Koch, University of Applied Sciences Hildesheim Prof. Dr. Johnner Sitompul, Institute of Technology Bandung Benedictus Ray Harsumanto, student at the Institute of Technology Bandung				
Representative of the ASIIN headquarter: Dr. Andrea Kern				

[1] ASIIN Seal for degree programs.

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 05 - Materials Science, Physical Technologies; TC 09 - Chemistry.

Responsible decision-making committee: Accreditation Commission for Degree Programs	
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of December 9, 2011 Subject-Specific Criteria of Technical Committee 05 – Materials Science, Physical Technologies as of September 29, 2016 Subject-Specific Criteria of Technical Committee 09 – Chemistry, Pharmacy as of March 29, 2019	

B Characteristics of the Degree Programmes

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
Mechanical Engineering	Sarjana Teknik S.T. / B.Eng.	Energy Conversion Materials and Manufacturing Mechatronics Design and Construction	6	Full time	-	8 Semester	218 ECTS/144 SKS	Annually in August / 2012
Chemical Engineering	Sarjana Teknik S.T. / B.Eng.	Chemical Engineering	6	Full time	-	8 Semester	218 ECTS/144 SKS	Annually in August / 2015
Materials and Metallurgical Engineering	Sarjana Teknik S.T. / B.Eng.	Manufacturing of Materials Innovative Materials Material Failure and Prevention Computational material	6	Full time	-	8 Semester	218 ECTS/144 SKS	Annually in August / 2013

The Kalimantan Institute of Technology (Indonesian: Institut Teknologi Kalimantan or ITK) is a public university in East Balikpapan (Kalimantan/Borneo, Indonesia). The focus of the university lies on technology to support the needs of the industry, especially in the region and on Kalimantan. In its vision, the university states that it wants to become a superior university and play an active role in the national development through empowering the potential of the Kalimantan region until 2025.

ITK was established in 2012 in collaboration with the Sepuluh Nopember Institute of Technology (ITS; in Surabaya on Java, Indonesia). As an well-established and successful institution in Indonesia, ITS provided initial support in the creation of the university and its study programs. As a state university, ITK is strongly regulated by the Indonesian government.

Originally established offering only five study programs, ITK has expanded to 22 study programs and five faculties. Of those, three study programs are under review for international

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

accreditations in 2023. For the future, the university plans to introduce its first master degree programs.

Currently, ITK has 4,876 students and 1,907 alumni. The university employs 274 lecturers and 120 non-scientific staff members within five faculties. It has 25 established international collaborations, including for example Utrecht University in the Netherlands, Keio University in Japan and the Technical University Munich in Germany. The research activities at ITK have already led to multiple research publications and innovations, such as a smart buoy for tsunami monitoring. The university focuses on a representative global education and it is working towards becoming an entrepreneurial university.

Three bachelor programs are under review in this accreditation.

For the Bachelor's degree program "Mechanical Engineering", the institution has presented the following profile on their webpage:

„*Vision*

Becoming a Mechanical Engineering Department that is able to compete and have an active role in science and technology through empowering the potential of Kalimantan in order to advance national development in 2025.

Mission

1. Organizing the Three Pillar of Higher Education in a sustainable manner in order to optimize the potential of the Kalimantan region.
2. Create graduates who excellent in the field of mechanical engineering, are virtuous, have an active role in national development and are relevant to the latest needs.
3. Building cooperation with stakeholders in the context of resource development and research.

Goals

The Mechanical Engineering Study Program (ME) program objectives are derived from the goals of Institut Teknologi Kalimantan (ITK). It essentially deals with human resources development with specific skills in science and technology necessary for natural resource utilization. The study program objectives are listed as follows:

1. To produce graduates who master mechanical engineering knowledge and can keep up with developments in science and technology
2. To Create synergy between science, technology, and natural resources to improve the people's economy

3. To produce researches and innovation that can compete nationally and can be implemented in to foster national development

Motto

LEBENSKRAFT.“

For the Bachelor’s degree program “Chemical Engineering”, the institution has presented the following profile on their webpage:

“*Vision*

Chemical Engineering Study Program of Institut Teknologi Kalimantan will become an Excellent and Trusted Center for Chemical Engineering in Kalimantan in 2025.

Mission

1. Organizing quality higher education to produce graduates who have global competence.
2. Develop research and community service that is sustainable and based on the regional potential to create an independent and prosperous society.
3. Implementing the governance and management of a credible and trusted study program.

Goals

1. Prepare the graduates to be a professional, solutive and competitive engineer with the chemical engineering knowledge as well as a good leadership skill and integrity
2. Produce research to give added values into material or process as well as beneficial and giving solution to the problem faced by community

Motto

Excellent and Trusted.”

For the Bachelor’s degree program “Materials and Metallurgical Engineering”, the institution has presented the following profile on their webpage:

“*Vision*

Become a study program that has superior competence in the field of materials engineering and metallurgy in the Kalimantan region by 2025.

Mission

1. Organizing teaching, research and community service in the field of material engineering and metallurgy
2. Produce graduates who are competent in the field of material engineering and metallurgy and have noble character so that they can play an active role in national development
3. Building cooperation in the field of material engineering and metallurgy with stakeholders at regional and national levels.

Motto

There is No Engineering without Materials."

C Expert Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Self-assessment report
- ITK main webpage https://itk.ac.id/en/
- Webpage “Mechanical Engineering” https://me.itk.ac.id/en
- Webpage “Chemical Engineering” https://che.itk.ac.id/en
- Webpage “Materials and Metallurgical Engineering” https://mme.itk.ac.id/en
- ITK Academic Regulation
- Diploma and Diploma Supplement
- Discussion during the on-site visit

Preliminary assessment and analysis of the experts:
All three study programs under review are bachelor programs. While the programs “Mechanical Engineering” (ME) and “Chemical Engineering” (CE) are based in the department of Industrial and Process Technology, the study program “Materials and Metallurgical Engineering” (MME) is associated with the department of Earth and Environmental Science. In the self-assessment report (SAR), ITK has described objectives and program learning outcomes for each study program, which match with the presentation on the webpage.

The ME program focuses on the specific skills and technology necessary for natural resource utilization. The university lists the following objectives in their SAR:

1. “Have knowledge and competencies for careers and jobs in mechanical engineering.
2. Able to work in teams, communicate effectively with different scientific backgrounds, and become a leader.
3. Able to take responsibility for work by applying professional ethics, especially in solving problems in the field of mechanical systems.”

Based on these objectives, the university defined the following intended learning outcomes in the SAR for the study program ME:

1. “An ability to communicate effectively in oral and written manners with a range of audiences.
2. An ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective.
3. An ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives.
4. An ability to apply Pancasila values, ethical and professional responsibilities.
5. An ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies.
6. The ability to identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics in mechanical systems in global, economic, environmental, and societal contexts.
7. The ability to model, analyze, design, and realize physical systems, components or processes using appropriate materials by utilizing information technology.
8. The ability to develop and conduct experiment, analyze and interpret data, and use engineering judgment to draw conclusions.”

In recent surveys among alumni, ITK can document that the qualifications of the study programs are well accepted in the industries. A high percentage of the alumni is pursuing a profession within the fields of their bachelor degree (79.15%). According to a survey conducted in 2020, alumni of the program ME mainly work in the field of mining and exploration, oil and gas and energy, construction, maintenance and remanufacturing, palm trees and plantation and education and research. The job profiles of the graduates can be summarized as

- Mechanical Engineer/Analyst: Able to conceptualize, design, and redesign mechanical systems and products, install new or modified mechanical devices
- Mechanical System Designer: Able to design mechanical system components and produce engineering drawings for various mechanical systems or components
- Production Engineer/Analyst: Capable of handling manufacturing process, planning the production route, monitoring, assessing, and, if necessary, developing the production processes based on the results of project
- Engineer/Analyst: Able to prepare and deliver an engineering project, including related activities such as project evaluation and forecasting.

For the study program CE, ITK has described the following objectives in the SAR:

1. “Prepare the graduates to be a professional, solutive and competitive engineer with the chemical engineering knowledge as well as a good leadership skill and integrity
2. Produce research to give added values into material or process as well as beneficial and giving solution to the problem faced by community.”

The following intended learning outcomes derive from these objectives as outlined in the SAR:

1. “An ability to communicate effectively in oral and written manners with a range of audiences.
2. An ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective.
3. An ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives.
4. an ability to apply Pancasila values, ethical and professional responsibilities.
5. An ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies.
6. An ability to apply the concepts of natural science, engineering mathematics, science, engineering, engineering principles, and engineering design to solve chemical engineering problems.
7. An ability to solve engineering problems in processes, processing systems, and equipment to convert raw materials into products that have added value by taking into account economic, public health and safety, cultural, social and environmental factors; and.
8. An ability to design and control processes, processing systems, and equipment needed to convert raw materials into value-added products with an analytical approach and taking into account technical standards, performance aspects, reliability, ease of application, sustainability, and taking into account economic, health and public safety factors, cultural, social and environmental.”

Graduates from the study program CE can work in various kind of industries related to chemical processes. The majority of graduates pursue a career in the field of their bachelor education (85.71%). ITK has therefore adapted the skill set and knowledge of the graduates to match the following occupations in particular:

- Process Engineer: Process engineers are responsible for designing, controlling, and optimizing industrial processes. CE programs enable the graduates to design industrial processes to convert raw materials into more valuable goods. With the knowledge of the designing process, the graduates are also expected to be able to modify the existing plant to have better performance or efficiency. In addition, CE graduates also know about controlling the process to meet the design of the process.
- Production staff: The production staff is an engineer who supplies day-to-day support for a production process. This program's knowledge of chemical substances, processes, safety, and other supporting knowledge set is sufficient for the graduates to play their role as production staff.
- Environmental Engineer: Chemical engineering graduates can be environmental engineers responsible for the relationship between the chemical process and the environmental aspect to meet the requirement of environmental regulation.
- Sales Engineer: Understanding chemical substances, processes, and equipment is beneficial for the graduates to work as sales engineers. In addition, the graduates are expected to have good communication skills that help them deliver ideas. As a result, CE graduates can work professionally as sales engineers with sufficient knowledge and good communication skills.
- Researcher: The graduates have adequate basic and advanced knowledge; they are also complemented with research skills. Thus, they will be able to do research. For example, the research could be about developing a new product or process and improving the efficiency and cost-effectiveness of the existing product/process.
- Regulator: Understanding the chemical process can support graduates who want to pursue careers as regulators. The regulator is a staff member in a government institution responsible for administration and regulation. Chemical engineering graduates can be a regulator related to chemical products and processes.
- Consultant: CE consultants use their specialized knowledge to businesses and governments about chemical processes. The CE program is also equipped with math, analytical, and teamwork skills to work professionally as consultants.
- Entrepreneur: CE programs enable the graduates to solve problems that are meaningful to the market; this is useful for them to become entrepreneurs. In addition, a feasibility study of an industrial plant sharpens the graduate’s skill set to plan a business primarily to see whether a business will be profitable or not. Furthermore, additional knowledge such as entrepreneurship, engineering economics, and operation management also give additional knowledge to run a business.

The objectives for the study program MME are summarized in the SAR as following:

1. “Pursue careers as successful professionals in materials and metallurgical engineering and related fields, obeying the professional code of ethics.
2. Pursue lifelong learning opportunities to improve and expand their technical and professional skills.”

ITK has defined these intended learning outcomes for the study program MME in the SAR:

1. “An ability to communicate effectively in oral and written manners with a range of audiences.
2. An ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective.
3. An ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives.
4. An ability to apply Pancasila values, ethical and professional responsibilities.
5. An ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies.
6. The ability to apply basic sciences and engineering principles to materials systems.
7. The ability to apply knowledge in material processes, structures, properties, and performance using experiment, computation, and statistical methods to solve problems.
8. The ability to identify, analyze, and prevent material failure.”

Graduates from the study program MME are finding a career in accordance with their qualification profile of their study program (81.36%). They mainly work in the following professions:

- Research and Development Engineer: Our graduates have learned the theories and hands-on skills on various materials and their behaviors, various fabrication processes, and various materials characterization techniques. With these skills, they are qualified to work on analyzing and creating new designs of materials, new products, and new fabrication technologies.
- Manufacturing Engineer: With a comprehensive knowledge of materials processing and manufacturing, our graduates are highly qualified to plan, organize and run the manufacturing process effectively and efficiently to produce quality products.
- Quality Engineer: Equipped with the knowledge of various materials behaviors and how to inspect them, our graduates are qualified to organize, operate, and evaluate

the final product through a reliable and trustworthy inspection process according to applicable standards.

- Scientist and Academician: With the mastery of both theory and hands-on experiences, our graduates are qualified to carry out research and teaching activities in research facilities and educational institutions.
- Consultant: With the mastery of both theory and hands-on experiences, our graduates are qualified to analyze problems in a company and provide suggestions or input to improve business performance, especially in the fields of materials and metallurgy.
- Welding Engineer / Inspector: Supported with knowledge on subjects focusing on material failures, fracture mechanics, fractography, inspection methods, and welding technologies, our graduates are qualified to lead projects related to welding. Ranging from the procedural analyses, documentation, inspection, and other aspects related to welding technology.
- Corrosion Engineer / Inspector: Our graduates are equipped with knowledge and hands-on experience of corrosion and corrosion control. Therefore, our graduates are highly qualified to plan a design that can control corrosion of material in a structure, starting from field surveys, material selection, lifetime prediction of the material's resistance to corrosion, can analyze failures caused by corrosion, and providing methods on how to do so to prevent them.
- Entrepreneur: Our graduates are prepared to solve problems, including providing service or innovative problems to the market. In addition, students will get essential economic and managerial study to start and operate a business in materials and metallurgical fields.

According to the SAR, the university has matched the intended learning outcomes of each of the study programs under review with the subject-specific criteria (SSC) issued by ASIIN.

In the discussion with the program coordinators, the experts ask them to characterize the focus of the study programs. The program coordinators explain that, currently, they are not yet science- or practically-oriented. Since they are a new university, they still offer a mixture of fields; however, in the future they would focus more on applied research based on fundamental science. They continue that they currently see more opportunities to gain funding in the field of applied sciences as well as collaborative research with the local industry. In their opinion, there is a certain overlap with the local industry, which can potentially benefit the study programs in the future as well. They add that the local industry includes oil and gas and forest-related companies, which have a high demand in applied research.

The discussion continues on the question, how ITK establishes program learning outcomes (PLOs) of the study programs. The program coordinators note that this is a long process, in which several stakeholders are involved. They tell the experts that they consider the opinion of alumni, companies and students to create the PLOs. After surveying their input, ITK processes the information and continues to define the profile of the graduates of the study program. This is then the basis to define the indented learning outcomes (ILOs). The experts ask why soft skills are not integrated in the PLOs and ILOs. The program coordinators explain that this is not explicitly mentioned, because the aim to teach soft skills is part of the academic regulations, i.e., part of the Academic Integrity Policy at ITK, which applies for all students of ITK.

The experts ask if ITK has an advisory board, which they can confirm. They state that the advisory board contains academics from various institutions, representatives from the industry and Indonesian associations. Student representatives are further invited to join the advisory board. They add that the advisory board only meets to discuss changes in the curriculum, which is done on a regular basis. While large changes in the curriculum is performed every five years, small changes in the curriculum are done each year. However, the discussion how that the input of the advisory board is on the modules and deals less with the qualification profile of the graduates.

The students confirm to the expert panel that they chose to study in these programs because they are aware of the good perspectives on the job market. Others showed a deep motivation to become engineers in their selected fields.

In conclusion, the expert panel discussed the objectives and learning outcomes of the degree program (i.e. the intended qualifications profile) and confirm that these are described in a brief and concise way. They are well-anchored, binding and easily accessible to the public on the university's webpage. The experts consider that the aim and learning outcomes of the study programs reflect the level of academic qualification of an EQF 6 and fulfill the requirements of the ASIIN Subject-Specific Criteria. In the opinion of the experts, the learning outcomes are viable and valid and reflect the current status in their respected field and are well anchored in the local industries. The learning outcomes are analyzed on a regular basis and developed further, if necessary, which includes internal and external stakeholders (including students and representatives of the industry). The intended qualifications profile allows the students to take up an occupation, which corresponds to their qualification (professional classification). Further, in order to update and improve the programme objectives effectively, the experts suggest empowering the Industry Advisory Board, for feedbacks from industry regarding the study aims and qualification profile of the graduates at ITK.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-assessment report
- ITK main webpage https://itk.ac.id/en/
- Webpage “Mechanical Engineering” https://me.itk.ac.id/en
- Webpage “Chemical Engineering” https://che.itk.ac.id/en
- Webpage “Materials and Metallurgical Engineering” https://mme.itk.ac.id/en
- Diploma and diploma supplement
- Discussion during the audit

Preliminary assessment and analysis of the experts:
ITK describes in the SAR that the names of all bachelor programs under review are chosen in accordance with the Indonesian Ministry of Education.

The study program ME combined a higher education in mathematics, physics, chemistry, and fundamental material science/engineering to perform design, analysis, manufacture, test, and maintain mechanical mechanisms and systems. Previously, a misunderstanding in the name of the study program occurred, predominately among students who graduated from vocational high schools. To avoid any confusion, the university has introduced a module named “Introduction to Mechanical Engineering” in the first semester in this program, which has proven to be successful in clarifying the situation in the previous years.

The study program CE teaches the students about processing raw material to be a more valuable product by applying chemistry, physics, biology, safety and environmental consideration, humanity, and economic factors. The main field of occupation for graduates is in the chemical industry, which includes energy, petrochemical, oleochemical, food, beverages and the pharmaceutical industry. To provide the students the differences between chemistry and chemical engineering, ITK has implemented an introductory course in the first semester for all students (“Introduction to Chemical Engineering”). Confusion on the name is not as common as in ME.

The name of the study program MME is based on the combination of teaching the basics in material science and engineering. The curriculum initially focuses stronger on the processing of metals, which is the origin of the term “metallurgy” in the title. Currently, the program focuses equally on metals, ceramics, polymers and composites in manufacturing and material failure analysis. According to the SAR, the name of the study program caused

confusion among some stakeholders as the term “Materials engineering” is not commonly used in Indonesia. Nevertheless, ITK decided to keep this name as it has not affected the employability of the graduates. Furthermore, they want to contribute to establishing the term in cooperation with the Indonesian Materials and Metallurgy Association.

The experts emphasize in the discussion with the program coordinators the fact that all study programs contain introductory modules in the first semester to the topic and wonder why these titles might be misunderstood. The program coordinators agree and mention that this might be an Indonesian phenomenon. They remark that ITK offers an open house event, in which every study program invites interested people to visit the campus and learn more on the study programs. Each study program is presented at this event, together with the curriculum and the job perspectives. In the discussion with the students, it is confirmed that a higher number of students interested in the programs have a different perception on the content of the study programs. They add that 70–80% of the students in these study programs come from vocational schools, which might contribute to the misunderstandings in ME and MME. Therefore, the program coordinators still consider these introductory modules as important to make the content of the study programs clear to everyone involved as soon as possible. In addition, ITK is also actively promoting the study programs in order to overcome this confusion in the future.

The experts register that the names of the degree programs under review reflects the intended aims and learning outcomes as well as, fundamentally, the main course language.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- Curricular overview of each study program
- Module handbook of each study program
- ITK Guidelines for developing the curriculum
- Policy direction for the development of the ITK curriculum
- Curriculum review report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

When the study programs were initiated at ITK, the curriculum of ME, CE and MME were adapted from the same program of the Institut Teknologi Sepuluh November (ITS), which

acted as an advisor of the university. In 2020, ITK decided to renew the curricula and match the developments in technologies, industries, state regulations and the demand of the job market. The new curricula from 2020 had replaced courses and allowed the students more flexibility in accommodating the students' interests due to a higher number of electives. A complete review of the curriculum will follow in 2024, leading to the start of the new curriculum in 2025.

All study programs follow the standard amount of 144 sks credit points, which equal approximately 218 ECTS credit points. In the program ME, 132 sks credits are allocated for compulsory modules while twelve sks credits are for elective modules. In the first two semesters, the curriculum contains general and introduction modules on mathematic and basic science. From the first semester on, the students receive an "Introduction to Mechanical Engineering", which is accompanied by "Engineering Drawing" as a typical course for engineers right at the beginning. Starting from the third semester, the number of study program specific courses increases, although mandatory courses such as "Religion" or "Citizenship" can still be found in the fourth and sixth semester, respectively. From the seventh semester, the students are able to take elective courses. In addition, they have to take part in the modules "Practical work" and "Research proposal" which shall prepare the students for the work on their bachelor thesis. Taking part in internships is optional and can be taken as part of the elective courses or the independent learning campus program (MBKM). The workload in each semester varies between 27.2 and 31.71 ECTS credit points with the exception of the eighth semester (15.1 ECTS credit points). The curriculum of the program ME focuses on mechanical design, materials, manufacture, energy conversion and mechanical engineering complementary courses.

The program MME comprises of 16 sks credits for General Courses, 35 credits for Fundamental & Introductionary Material Engineering Courses, 41 credits for Core Engineering Courses, 28 credits for Advanced Engineering Courses, twelve credits for Capstone Courses, and twelve credits for Elective Courses. The distribution between general and specialized modules follow the scheme from the program ME with a gradual shift from general and introductory courses in the first few semesters to specialized courses and electives starting from the seventh semester. In the program MME, the seventh semester contains the module "Practical work" while the thesis is limited to the module "Undergraduate thesis" in the eighth semester. The workload is more evenly distributed among the semesters and ranges between 25.5 and 30 ECTS credit points per semester. The courses of the program MME cover the topics of material engineering and complementary courses, material simulation specialization courses, core material engineering courses and material failure specialization courses.

In comparison, in the program CE, 134 sks credits are compulsory while ten sks credit points are electives. The general courses are identical with the programs ME and MME, whereas the first and second semesters contain significantly higher amount of introduction to chemistry. The final semesters in the curricula show important differences to the curricula of the other two bachelor program since the seventh semester does contain the modules “Practical work” and “Research”. In these modules, the students shall work towards their bachelor thesis. In the eighth semester, these modules are complemented by the module “Final project” which focuses on the analysis of data and the writing of the bachelor thesis. This should give the students more time to work on their bachelor thesis and provide them more time to get experience in scientific research. The workload ranges between 27.2 to 31.7 ECTS credit points per semester with the exception of the eighth semester, which contains 21.2 ECTS credit points in the regular study plan. In the program CE, students learn the fundamental and applied chemistry, chemical engineering science and chemical engineering design and economics.

Since all study programs involve work in laboratories, the experts ask about the safety and security on campus. The representatives of the rector’s office explain that their personnel is trained to prevent accidents and are specifically trained when working in dangerous laboratories. They add that they improved the fire safety in the laboratories and on campus and add more safety signs. They also bought a larger number of personal protective equipment for staff and students. In addition, the safety officers of all laboratories are regularly reaching out to the students to ensure everyone is familiar with the safety regulations. The representatives of the rector’s office continue that a collaboration exists with the national agency for fire and catastrophes, with whom they will organize an advanced training in the future.

The experts are further curious why there are more laboratory classes than courses on computer modelling. The program coordinators comment that the students prefer to do practical work, which might be connected to their background in vocational schools. They add that there were recent changes in the modules on computer modelling; they switched to project-based learning to give the students more time to apply their theoretical knowledge in simulations. The students confirm to the experts that they learn programming and they consider it sufficient. Most mention that they do not learn programming in high school; therefore it is new for them. If someone is interested, then they can take additional elective courses. The alumni continue that their skills in the laboratory were very good, which was very helpful for them to integrate themselves in their company. They add that the programming skills could be improved; however, they require more often the application of software.

The discussion continues towards the topic of laboratory classes, which the program coordinators classify as soft engineering (e.g. physics and chemistry in the first semesters) and hard engineering (advanced laboratories in their study program). In all these classes, experiments and practical work is mandatory. The expert panel further asks the students, if they are satisfied with the number of laboratory courses, individual projects and research projects in their curriculum. The students describe to the experts that they enjoy their practical part of their studies. Usually, the practicum starts after the mid-term exam and is done every week. Their syllabus gives them detailed information when the laboratory classes are going to take place. The practicum usually lasts for two to three hours. Some students admit that they would prefer to have more laboratories activities and therefore they joined extra-curricular activities to conduct experiments. One student added that they were interested in additional laboratory courses, which she took in Malaysia, as the type of laboratory course is currently not offered at ITK. The experts are curious how students perform their laboratory work. The students state that they have individual projects as well as group projects. Depending on the study program and the module, the group size varies between two to five people. The experts ask if the practical work is always clearly stated in the module handbook, because these fundamental classes appear as pure lectures in the module handbook in their opinion. The program coordinators state that they the module handbook should reflect this. If it is unclear, they will pass on this information to the lecturers, who teach the fundamental courses.

Furthermore, the experts ask where students learn soft skills as these are also not mentioned in the module handbook. The program coordinators mention, that soft skills are integrated into the courses, especially during practical and assignment hours. The alumni state that in their opinion they have learned the essential soft skills to start their professional career. This includes especially teamwork as well as work under pressure. Upon the expert's question what distinguishes them from graduates from master programs, the alumni comment that graduates with a master degree are better at problem-solving and solving unexpected issues.

The next issue the experts inquire is on the practical development of the students. The program coordinators indicate that they have a matrix, which shows the gradual development of the students' practical skills during their studies. In the first and easiest practical sessions, the students receive instructions they have to follow step by step. In the next phase the students receive an assignment with the methods to apply whereas the final step is that the students only receive a problem and need to find the most suitable methods themselves.

The experts want to know more about the independent learning campus program (Merdeka Belajar Kampus Merdeka; MBKM) and how it is integrated at ITK. The program

coordinators clarify that the MBKM program was only issued at the end of 2020; however, their curriculum was initiated in early 2020. Therefore, the MBKM program is not really considered in the current curriculum. Nevertheless, the students can replace up to 20 sks credits from the curriculum with independent work or courses. Currently, this still mainly focuses on elective courses, which can also be used for taking longer internships (four to 24 sks credits). The program coordinators add that it is currently still not possible to substitute mandatory courses outside the campus unless they replace it with comparable courses at other universities. These externally taken courses are recognized by ITK and included in the transcript of records. For all other activities, there are guidelines for their recognition. This includes the internships, which need to be discussed with their advisors prior start(one advisor from ITK and one from the company). Before the internship, the advisor and the students need to verify topics, which need to be addressed during the practical work at the company. These topics are, however, not strict and can be re-adapted when the situations makes it necessary. On average, the students spend between three and six months at a company. The advisors then decides if the outcome of the replaced course is comparable to the learned skills during the internship. The experts are further interested on how internships are graded. The program coordinators explain that the students need to write a report and prepare a presentation in front of a jury. After the presentation, the students need to answer questions, which shall verify that they have succeeded in gaining all skills stated in the indented learning outcomes. In between, there is a weekly monitoring with the students to check on the progress. The experts are further interested in the qualification of the industry advisors. The program coordinators state that the industry advisors need to have at least a master degree or have more than ten years of experience in the industry to be able to supervise students. Upon the question, if they have regular partners for these internships, the program coordinators confirm having establish such collaborations with companies. Usually, they send the students to these companies, although many students also search for companies with whom ITK has no formal collaborations yet. The program coordinators mention that not all students apply to take part in an internship. The university supports each application with a letter of recommendation; yet in rare cases, the students do not fulfill all the requirements of the involved company and are not accepted. Currently, only around 5% of all students are taking part in internships. The students confirm that they took part in internships, which lasted up to six month. The representatives of the industry partners report to the experts that they regularly receive students, who normally stay for a 4-month internship in their company. Usually, they propose a problem to the university for a project and afterwards the university often considers if students can work on this and how many students would be needed for this project.

The students confirm that several ones have already joined the MBKM program. Some students participated in courses at other universities to learn new disciplines while other spend time aboard (Thailand and Malaysia). Other took part in internships at companies within the MBKM program. They explain that they had an academic and a company advisor with whom they discussed the company and student needs. At the end, the prepared a presentation and a report, where they described if the accomplished the ILOs, therefore confirming the statement of the program coordinators. The students state that they would like to take more internships in order to apply their knowledge. The experts also address the teaching staff of the MBKM program. These describe to the experts, that the MBKM program is a pilot program from the government and that they are currently following the guidelines and integrate those in the ITK regulations. The main purpose at the moment is to allow the students to take part in internships and allow them to take courses at other universities. They notice that ITK allows only to substitute 20 sks credits with the MBKM program, which is less in comparison to other universities in Indonesia. The teaching staff from the ME program state that they did not have to make many adaptions because of the MBKM program. They initiated a discussion with companies concerning the internship. The teaching staff adds that all additional activities of the students will be represented in the transcript of records. Furthermore, the teaching staff confirms to the students, that each person participating in an internship at a company will have two advisors, with whom they work on a special agreement concerning the content of the internship. The discussion with the students on the plan of the internship includes a detailed plan how the outside workload is transferred to credit points. The teaching staff admits that the first batch of students, who participated in the MBKM program, received often too much workload for the time of the internship. Since then, the number and type of tasks the students need to perform outside campus has been improved.

Since students can take additional courses and expand their internships, the experts are curious on the completed amount of credits at graduations. The program coordinators specify that the students need to have at least 144 sks credits in order to graduate. In the previous years, they have seen students who graduated with 147 sks credits; yet anything above 150 sks credits is hard to achieve because of the high workload.

The experts continue to discuss the final project of the three study programs under review. They mention that the research skills are stressed in a higher degree in the program CE. The program coordinators describe that the final project in the CE program was changed based on an evaluation from the year 2020. In this evaluation, they concluded that the final project was not well designed because the final project was one single project only. Therefore, the new curriculum contains additional research-oriented projects, such as courses on research in the seventh semester (module “Research” and “Practical work”) plus the

final thesis in the eight semester. In comparison, the program ME has one module on the proposal of the final project (two sks credits) and the final project (four sks credits). The experts further ask if the final project is research-based in the program MME as it is not as clearly stated as in the other two programs. The program coordinators add that the students' final project should include research in the sense, that they should design and perform their own work. This research can also be done within an external company, however, usually not within a larger research project. The students consider the current situation suitable for all study programs. The program coordinators confirm to the expert panel that the final projects needs to be defended in front of a jury. The students endorse the statement of the program coordinators by explaining the difference between the research in CE and the programs ME and MME. The students describe that in CE, they need to develop a chemical plan design, which contains the entire production of one product with all their methods and equipment involved. This includes further information on the production cost. The entire plan will be compiled in several different modules spanning the seventh and eighth semester and will be summarized in a scientific report, a research program and the plan design project. In MME and ME, the students work on only one project, which they consider as enough. This project represents their final thesis. Additional modules prepare them to work on this final project; however, they only do the actual work within one project. Therefore, the experts consider the final project well suited for each study program.

The experts further raise the topic why the final project has only six sks credits, which is according to government regulations as explained by the program coordinators. On the one hand, this could give exceptional students the opportunity to graduate in the seventh semester while on the other hand the students have more time for their final project. The program coordinators specify that they tried to distribute the most work-intensive courses in earlier semesters to avoid a peak in workload at the end of the studies. Successful students can further take courses from higher semesters if they wish to study faster. In contrast, students from the program CE cannot graduate before the eight semester because they have to work on research projects in the seventh and eighth semester.

The experts address the students further on their opinion on the curriculum. The students state that in general, they are satisfied with their study program. They explain that every study programs contains fundamentals in every course in addition to the basics in the first semester, which they consider enough. The students think that the basics are individually more or less difficult, but important in their fields. The students prefer learning in their specialized field; therefore, they consider the learning becomes easier with time. The teaching staff clarifies that in the first year, all students learn together; only in the third semester, the students will be separated based on their study programs. In the program ME, the curricular review showed that there are sufficient fundamental and basic courses

for the students. In contrast, in the program CE, the added three more chemical modules on basic chemistry. Also in the program MME, the curriculum was adjusted to contain more courses that are fundamental. The alumni of the programs support this opinion. They state that they have received sufficient training in order to work in their current professions. Additionally, they consider that the study programs have improved since their graduation. The only point of criticism is that certain jobs in the field of ME, MME and CE require additional certificates in order to work. The university does not offer these certificates at the moment, which is the only aspect they would suggest to improve. Since this are very specific certificates, the expert can understand the opinion of the alumni, but does not consider it the university's responsibility to offer them.

Although the alumni and industry partner are very satisfied with the students and graduates from the three study programs under review, they suggest to the experts small improvements. In the program CE, they would consider it beneficial to learn more on safety in the laboratories as well as on quality control in the laboratories. In the program ME, alumni would wish to have even more practical courses in order to prepare them for their future jobs. Therefore, they suggest the curriculum needs to include an internship for all students. Other alumni explain the experts that they highly value their education at ITK as they had the impression to have more practical experience in comparison with graduates from other universities. Furthermore, it was easier for them to learn new processes and skills at the company as well.

The experts consider that the curriculum of the three study programs under review allow the students to achieve the intended learning outcomes in order to obtain the bachelor degree. They state that the objectives and intended learning outcomes of the modules and the degree program are systematically substantiated and updated. In the opinion of the experts, the curriculum clearly states which knowledge, skills and competences students will acquire in each module. Nevertheless, the experts would welcome if the laboratory in the curriculum could be expanded in order to allow the students to gain more experience in laboratories on campus.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Academic regulations
- Students handbook
- ITK main webpage https://itk.ac.id/en/

- Discussions during the audit

Preliminary assessment and analysis of the experts:
According to the Self-assessment report, the admission of new students follows different processes. The different ways of entry are designed to select the top-quality students from high schools, and additionally provide opportunities for high school students from all over Indonesia, with a focus on rural/local areas. ITK sets high admission standards and generally admits students who are able to obtain a competitive entrance examination score.

There are three different paths of admission into the bachelor programs under review:

1. National Selection of Higher Education or University (Seleksi Nasional Masuk Perguruan Tinggi Negeri, SNMPTN), a national admission system, which is based on the academic performance during high school.
2. Joint Selection of Higher Education or University (Seleksi Bersama Masuk Perguruan Tinggi Negeri, SBMPTN). This national selection test is based on the results of a test (UTBK) which is held every year for university candidates. It is a nationwide written test (subjects: mathematics, Bahasa Indonesia, English, physics, chemistry, biology, economics, history, sociology, and geography).
3. Integrated Independent Entrance Examination (SUMMIT). Students are selected based on criteria determined by ITK itself. It mainly follows the results of UTBK, but also considers other criteria such as achievements and motivation of the students.

In average, 50% of the students got their submission with regard to their school grades (SNMPTN), 40% by national examination (SBMPTN), and 10% by institution examination (SUMMIT ITK).

The following table shows the numbers of admissions in each study program for the last 3 years.

Table 2 Number of registrants and enrolled students for the ME, CE, and MME

Program	Year	SNMPTN		SBMPTN		SUMMIT		Total registrants	Total enrolled	Ratio
		Reg	Enroll	Reg	Enroll	Reg	Enroll			
ME	2019	126	33	175	47	0	6	301	86	0.29
	2020	144	16	189	72	0	4	337	92	0.28
	2021	168	18	194	68	39	3	401	89	0.22
CE	2019	144	48	161	32	3	3	308	83	0.27
	2020	122	19	103	70	2	2	227	91	0.40
	2021	93	33	89	52	15	3	197	88	0.44
MME	2019	80	32	102	28	0	2	182	62	0.34
	2020	57	15	65	23	0	1	122	39	0.31
	2021	86	38	71	32	16	2	173	72	0.26

To study at ITK, students need to pay a tuition fee. The level of the fees depends on the parents' income. For students from underprivileged families, there are exceptions, and no tuition fees have to be provided. In addition, ITK offers different scholarships to support the students. Information on fees and scholarships is provided on the official webpage.

Admission usually is done via the webpage of the university. The admission website informs potential students in great detail about the requirements and the necessary steps to apply for admission into the programs. In the discussion, the representatives of the rector's office explain that the students need to pay for their registration before they can choose their study program. The representatives of the rector's office add that the government regulates the quota of accepted students from the different admission options. On average, the admission of the national selection is around 30%, whereas the admission based on the computer test has a maximum of 40%. The admission quota of the test done by the university is normally around 20%. The experts ask about some inconsistencies in the presented numbers, as the number of registered students is often lower than the number of enrolled students. The representatives of the rector's office reply that these numbers are the result because students register for various study programs. They add that the numbers of registered students was lower during the COVID-19 pandemic, but increased by 30% in 2023.

The experts further inquire if ITK wants to increase the number of students. The representatives of the rector's office explain that 80% of the students at ITK are from Kalimantan. They would like to increase the number of students and therefore they promote the university in high schools. In addition, they offer an "open house" event, where high school students can visit the campus. Moreover, ITK plans to start a program to give students with high achievements in sport or language special admission opportunities.

Finally, the experts are interested, if the representatives of the rector's office consider the qualifications of the students from one admission scheme more suited for ITK. They state that based on their current data and experience, the students from the national test are more successful than from the other programs; however, ITK also admits a higher number of students from this scheme. In order to explain this success, the representatives of the rector's office mention that the national test allows them to focus on certain subjects, such as mathematics or physics, which are especially important in the main fields at ITK.

Since the rules are based on decrees by the ministry of education and on the university's written regulations, the experts deem them binding and transparent.

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

Add criterion 1.3.

ITK commented in their statement (full statement in section) and the experts' suggestion to increase the number of practical and laboratory classes in the curriculum. ITK states that it appreciates this feedback and that they will consider it during the next curriculum revision in 2024. Since no changes were made so far on the curriculum, the experts continue to issue the recommendation E1.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-assessment report
- Academic Regulation of ITK
- Curricular overview of the study programs
- Module handbook of each study program
- Curriculum matrices
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The academic year at ITK is regulated by the academic regulations of ITK.

The bachelor programs ME, CE, and MME comprise eight semesters, which are usually studied in four academic years. Each semester contains 16 weeks of learning activities. The entire study program contains 144 Indonesian credit points (sks points), which equal approximately 218 ECTS credit points. A transfer calculation from SKS points to ECTS credit points is described in criterion 2.2.

The study program contains mandatory and electives courses; the latter comprise between 7–8% of the total amounts of credits. The majority of modules contain two to four sks credit points. Exceptions are the module "Undergraduate thesis" in the program MME (six sks credit points), the module "Final project" in the program CE (twelve sks credit points) and elective internships of different workload in each of the programs.

The entire study programs are organized in modules, which represent one separated learning unit. The composition of the modules of each study program is determined considering the program learning outcomes of the study program. The structure of the study programs follows the principle of an introduction, followed by fundamental science and engineering, advanced engineering and ends with the specialization of the students. In addition, soft skills courses and courses on supporting skills are categorized as general. ITK aims to have a balanced curriculum with theoretical and practical courses.

The course can be divided into the following categories.

Table 4 Lists of module's hierarchy in ME, CE, and MME undergraduate program

Modules Hierarchy	Allocated credits					
	ME		CE		MME	
	ECTS	%	ECTS	%	ECTS	%
Introduction	44	20	32	15	44	20
Fundamental Specific Programs	71	33	70	33	71	33
Advanced Engineering	50	23	51	24	42	19
Capstone & Final Project	14	6	18	9	18	8
Elective Courses	18	8	15	7	18	8
General Courses	21	10	26	12	24	11

ITK has further implemented the national independent learning program, Merdeka Belajar Kampus Merdeka (MBKM). This program allows students to receive credits for off-campus

learning activities. These activities can include student exchange, research, independent study or internships. The workload of these activities is recognized based on a credit equivalence system and included in the transcript of records of the students.
The program coordinators confirm to the experts, that all three programs under review contain mandatory and elective modules. The mandatory courses are further divided into the freshman courses, which are planned to take place between the first and third semester, and the advanced and applied courses, which start in the fourth semester. The elective courses focus in many cases on applied research of which some are close to the industry. Therefore, if students are interested in working in a specific field, they can take these courses to gain more knowledge and practical experience in this discipline. The experts add the question if students can only take electives in the seventh and eighths semester, which the program coordinators deny. They clarify that students can take elective modules from the fourth semester on; however, they need to have a high Graded Point Average (GPA) in order to take these additional courses to the curriculum. The experts further notice that several of the electives are listed as "not available" and wanted to know, how this affects the students. The students explain to the experts that this does not cause them to study longer since all compulsory courses are given on a regular schedule. They add that they simply take other courses if one course is listed as not available. The students add that they have a special webpage that informs them when a course will be available, because also the majority of the elective courses follows a rotation principle.

In total, the experts remark that the amount of electives is low with a share of below 10% of the total credit points. The program coordinators specify that based on the current regulations, students take five electives, which they provide in the curriculum. Furthermore, they plan to reevaluate the curricula of the study programs under review during the next full curriculum evaluations in 2024. In this process, they will survey the opinion of internal and external stakeholders on this issue and would adapt it if requested.

The experts comment that there are many modules with less than five ECTS credit points. The program coordinators confirm that this is the case, especially for electives modules. In the discussion they admit that the time in these modules is sometimes short, especially if the students have to perform practical work or receive a project assignment. Therefore, they tried the make the workload for the students in these modules very small to match the number of ECTS credit points.

Moreover, the experts inquire if credit points from other universities are recognized. The program coordinators state that credit points are recognized after comparing the module's indented learning outcomes. This is similar to the regulations regarding the MBKM program (compare criterion 1.3). Prior to taking the course at another university, the students should meet with their advisor to discuss which of the module can be substituted. They

compare the content of the modules as well as their workload. The main problem is that the structure of the curriculum at different universities varies; thus, often courses are taught at a different semester. Nevertheless, they try to be flexible in the recognition of externally awarded credit points. The program coordinators also confirm to the expert panel that also the grades are accepted.

International Mobility

ITK is currently developing plans to increase the student mobility. Therefore, the university has implemented the new Independence Learning program (MBKM), which allows the students to spend up to three months outside their university. This program allows the students also to go abroad, either for taking courses at foreign universities or taking part in internships outside Indonesia. The Indonesian government has issued a guidebook to regulate the conversion from work performed outside the campus to credit points.

The following table shows how many students have participated in the MBKM program on a national and international level:

Table 17 Student mobility in 2018-2021 for ME, CE, and MME

Student Mobility	National			International				Internship
	2019	2020	2021	2018	2019	2020	2021	2021
ME	-	-	9	1	2	1	-	2
CE	8	14	57	-	2	2	1	2
MME	-	-	7	-	-	-	-	4

Table 18 Inbound student in 2021 for ME, CE, and MME

Inbound Mobility	National		
	2019	2020	2021
ME	-	-	-
CE	-	-	13
MME	-	-	2

In the discussion with the representatives of the rector's office, the experts raise the topic of student mobility and international collaborations. They explain that there is already a high number of students taking part in mobility programs visiting universities in Indonesia and Malaysia. To go abroad, the students can apply for the governmental program "Indonesian international student mobility awards (IISMA), which five students from ITK received

last year to visit universities in Malaysia. Further, exchange programs on international level are available for students and employees at ITK, including Earasmus+ and DAAD. In addition, the representatives of the rector's office highlight the collaboration with the Saga University in Japan, which offers students from ITK special grants to continue their education on mater and decretal education. The rector's office continues to expand their international collaborations, which lead to new connections to two universities in China and a collaboration with China University in Japan. ITK further has an International Office, which on one hand supports the students with finding opportunities to go abroad and on the other hand supports them in transferring their achievements to Indonesian credit points. The International Office is constantly looking out for scholarship and program calls. Several students confirm to the experts that they successfully applied for IISMA and spend time abroad.

In the discussion with the alumni, some mention to have continued their master studies at national and international universities. In order to strengthen the collaboration with these universities, they suggest it is necessary to allow to co-supervise students. This would allow many talents from ITK to continue their higher education at partner institutions in Indonesia and abroad.

In summary, the experts confirm that all bachelor programs under review are divided into modules and that each module is a sum of teaching and learning whose contents are concerted. The experts consider that the structure of the curriculum of each study program allows the students to reach the learning outcomes and complete the degree without exceeding the regular course duration. In the opinion of the experts, each module has clear requirements and objectives, which support the students in reaching the qualification profile of the study programs. Practical courses play a vital role in the three study programs under review, which allow the students to take part in internships outside the campus due to the implementation of the MBKM program. ITK monitors the external learning process in order to ensure the quality of the off-campus learning. Furthermore, the university recognizes the achievements and competences acquired outside the higher education institution.

Criterion 2.2 Workload and credits

Evidence:

- Self-assessment report
- Module handbook of each study program
- Transfer calculation of SKS points to ECTS points

- Statistics on the study process of the students
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The workload of the students at ITK is measured in Indonesian credit points in the Semester Credit System (SKS). The regulations define one credit point based on the following criteria:

1. 1. SKS calculates students' workload based on semester credit unit (sks, written in lowercase).
2. 2. One (1) sks credit consists of 170 minutes of learning activities per week per semester.
3. 3. One (1) semester consists of 16 meetings or 16 weeks of learning activity.
4. 4. One (1) sks credit can be broken down to durations of different activities:
    a. For a lecture activity: 1 sks equals 50 minutes of teaching and learning process, 60 minutes of structured assignment, and 60 minutes of independent learning. Example: lectures, responses, tutorials.
    b. For a seminar lecture or other kinds of similar instructional activity: 1 sks equals 100 minutes of learning activities process and 70 minutes of independent learning. Example: seminars.
    c. For a practicum, studio practicum, workshop practicum, designing, development, military training, student exchange, internship, entrepreneurship, or community service is quantified for 170 minutes.
    d. The total duration of learning activities per week should not exceed 170 minutes for other activities.

Consequently, the conversion from sks credits to ECTS credit points is complex. ITK has issued the following principles for the conversion from sks to total hour system (ECTS credit points):

> 1 sks = 170 minute per meeting x 16 meeting per semester = 2720 minutes = 45.33 hours

Conversion from sks to ECTS:

> 1 ECTS = 30 hours of learning activity.
>
> 1 sks = 45.33 hour / 30 hour = 1.511 ECTS
>
> 1 sks = 1.51 ECTS

The workload of the students in each study program

Academic Semester	Allocated credits								
	ME			CE			MME		
	sks	ECTS		sks	ECTS		sks	ECTS	
1st semester	18	27	54	18	27	54	19	29	54
2nd semester	18	27		18	27		17	25	
3rd semester	21	32	61	19	29	59	19	29	59
4th semester	19	29		20	30		20	30	
5th semester	20	30	59	21	32	61	18	27	56
6th semester	19	29		19	29		19	29	
7th semester	19	29	44	15	23	44	18	27	48
8th semester	10	15		14	21		14	21	

The student workload in each semester on average ranges between 18 and 21 sks, which equals 27–32 ECTS credit points. Therefore, the total workload of one semester varies between 1,500 and 1,800 hours, which is suitable according to the ECTS User's Guide.

The amount of sks credits students are allowed to take during the semester depends on the Semester Academic Index (SAI) of the student. Students with higher grades are allowed to take more sks points per semester to proceed faster with their studies, while students with poor grades or out-of-university activities are allowed to take less courses per semester.

The maximum learning activity of the students follows these regulations:

Semester Achievement Index (SAI)	Maximum Learning Activity	
	sks	ECTS
$4.0 \geq SAI \geq 3.5$	24	36
$3.5 > SAI \geq 3.0$	22	33
$3.0 > SAI \geq 2.5$	20	30
$2.5 > SAI \geq 0.0$	18	27

In the discussion with the program coordinators, the experts ask how the workload is determined and monitored in real life. They explain that this depends on the type of module. The workload is defined by the government standards; in addition, they conduct evaluations at the end of each semester to obtain student feedback. This includes a question on

the real workload in comparison to the awarded credit points. Based on this evaluation, adjustments were previously made.

The students describe to the expert panel that they consider the workload of the three study program under review as adequate. They confirm that they have enough time to spend the evening with private activities instead of learning. The amount of classes in each semester varies; if they have four sessions, this means that they have several days a week with eight to ten hours, but not every day. Others state they also join extracurricular activities or work as lecturer assistant. The students confirm to the experts that they are aware the workload of one sks credit point.

The experts approve the ITK's rules and regulations concerning the workload of the students. They state that the estimated time budgets are realistic enough to enable students to complete the degree without exceeding the regular course duration. The university has created a structure to avoid peaks in the workload. The experts add that a credit point system oriented on the amount of work required from students has been devised. This workload comprises both attendance-based learning and self-study. Furthermore, a transfer of Indonesian sks credit points to ECTS credit points was presented; conversions are included in all important documents with the exception of the transcript of records (see criterion 5.2).

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report
- Module handbook of each program
- Discussion during the audit

Preliminary assessment and analysis of the experts:
ITK describes the common teaching practices in their SAR. In the three bachelor programs under review, the teachers mainly apply student-centered learning. This includes the use of discussions, case-based learning, project-based learning as well as problem-based learning methods. The didactic methods in each module are chosen to enable the optimal method for the students to learn the learning outcomes of the module.

To support the learning and the distribution of online material, ITK uses a learning management system based on a moodle framework. Every faculty has the option to upload learning media and assignment on the LMS to support student achievement on learning outcomes.

The expert panel confirms that various teaching methods and instruments are used to support the students learning process in achieving the learning outcomes. The experts consider the degree programs under review are well-balanced between attendance-based learning and self-study. The three bachelor study programs allow the students to gain their first impression in independent academic research and scientific writing.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Student handbook
- Discussion during the audit

Preliminary assessment and analysis of the experts:
In order to support students in completing their studies on time with good achievements, the university and the faculty provide academic and personal support and assistance through various means.

In the first semester, every student receives an academic advisor, who acts as the main person to support the students. An academic advisor helps the students to develop an adequate schedule for their studies, choose a suitable amounts of courses per semester, choose electives according to their skills and interests and support them in case of academic and non-academic problems. In addition, the academic advisor suggests extra-curricular activities to the students to develop their technical and soft skills outside the classroom. In addition, the academic advisor shares information on scholarships, teaching assistance opportunities or student competitions. Therefore, the academic advisor has access to the study plan of their students to be able to monitor the study progress. This allows the academic advisors to reach out to the students if the student does not perform according to their schedule. Each student should meet with their academic advisor on a regular basis (at least twice per semester) in order to discuss these matters.

ITK further operates a Career Center, which works closely together with the Center of Student Development and Alumni. The Career Center prepares the students and graduates for their future professions. This includes counseling services, career preparation, training, assessment and evaluation. They further organize a career expo, which companies mainly use to scout talents, offer internships and present employment opportunities. In addition, the Career Center gives general advice to the students on finding internship programs outside the campus.

All students at ITK have access to an online-learning site (internal learning management system or LMS). By using LMS, lecturers can upload their syllabus and learning materials as well as assignment for students. Through LMS, students can also interact with other students and lecturers.

In the discussion with the representatives of the rector's office, the experts inquire if there are special programs to support women in the study programs under review. They reply that they are aware of the low number of female students, particularly in study program ME. Their admission system is solely based on achievements; however, when possible, they often give higher points to the female applicants. Furthermore, they reach out to female students in high schools to motivate them to join the engineering programs at ITK and change the prejudice that programs like ME are more suitable for males. They further support their students in joining awards, where recently several female students from ITK have been successful.

The experts confirm that ITK has established resources to provide individual assistance, advice and support all students. The allocated advice and guidance (both technical and general) on offer assist the students in achieving the learning outcomes and in completing the course within the scheduled time.

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

Ad criterion 2.1.

In the statement of ITK to the accreditation report, ITK added an explanation to the amount of elective modules in the curriculum and their lower number of credits. In the report, it states the experts were wondering about this structure, although it is the usual situation in Indonesia according to ITK. The experts did not issue any requirements or recommendations on this subject.

3. Exams: System, concept and organization

Criterion 3 Exams: System, concept and organization

Evidence:

- Self-assessment report
- Module handbook of each study program

- Examples of written exams provided during the audit
- Examples of final thesis provided during the audit
- Examination regulations
- Undergraduate thesis guidelines
- Discussion during the audit

Preliminary assessment and analysis of the experts:
In each module of the study programs under review, the responsible person decides on the most suitable method to assess the students' comprehension, skills and competences in accordance to the learning outcomes. The assessment method shall ensure that the individual achievements of the course objectives are met. The assessment of the modules should take place in the same semester as the module. Afterwards, the result of the assessment is shared with the students in the academic portal of ITK.

Within the study programs under review, the lecturers apply various methods. The main method of assessment is based on written, followed by oral examinations. This method allows the lecturer to assess the individual achievement of the course objectives including comprehension and analytical skills. The students generally receive a set of questions they have to answer applying critical thinking skills as well as cognitive level thinking. The questions of the exams are reviewed on a regular basis. Another common assessment method uses individual and group assignments of a topic in a course. Moreover, laboratory activity is assessed to verify the individual practical achievement of the course objectives. The assessment is either based on observation or on written reports on the practical methods performed in the laboratory. In general, observation of students is applied in particular to assess the attitude, ethics and other behavior-related skills. This also considers the participation of the students in the classroom or laboratory classes.

Every course can integrate more than one assessment methods, depending on the course objectives. The applied assessment methods are presented to the students in the module handbook and syllabus and are communicated in person in the beginning of the module. In addition, the grading criteria are presented to the students in order to make the students' achievement transparent. The students can appeal if they feel their grades are not justified. The university then takes two weeks to consider the appeal before the final grades are released. Students can discuss directly with the faculty if there is a discrepancy with the assessment results.

The final grade of each module is calculated based on the score of these individual assessments, whereby the lecturer determines the ratio between them in accordance with the

Academic Guidelines. ITK uses a grading system with the grades A, AB, B, BC, C, D and E, where a C (equivalent to a Grade Point of 2) is necessary to pass a module.

Course Score	Letter Grade	Numerical Grade	Description
86 ≤ Score = 100	A	4.0	Very High Distinction
76 ≤ Score < 86	AB	3.5	High Distinction
66 ≤ Score < 76	B	3.0	Distinction
56 ≤ Score < 66	BC	2.5	Credit
51 ≤ Score < 56	C	2.0	Pass
41 ≤ Score < 51	D	1.0	Marginal
0 = Score < 41	E	0.0	Fail

Final thesis

In all three study programs under review, a final thesis is mandatory. Students in the programs ME an MME shall conduct an individual undergraduate project, in which they shall do independent research activities on a specific topic and write an academic report and research paper. In contrast, CE students work on a project-based undergraduate thesis, which is connected to a mandatory course to lower the weight and workload of the students in the final semester (capstone and final project).

The final project awards six sks points, which equals nine ECTS points. The work can be divided into an undergraduate seminar, the research activity, and the undergraduate exam. The undergraduate seminar takes place at the beginning of the thesis after the students have chosen their supervisor, found a research topic and potential funding options were considered. In the seminar, the students shall present their research proposal. This seminar aims to evaluate the correlation between problems, aims, and methods to ensure students can succeed with their undergraduate theses. After passing the exam, the students start to conduct their research activities. The students have to write and academic and scientific report and shall summarize the research activity, which shall span between four and a maximum of twelve months. With their final report, the students can apply to defend their undergraduate thesis. The undergraduate exam is a closed seminar, in which the candidate has to present their research in front of a jury in order to show their understanding and comprehension of the topic. The grades of the final project follow the same grading system as the exams; the students need to receive a letter grade C to pass the final exam, which equals 50 out of 100 points.

The experts state they still do not understand how the assessment method of each module is chosen. The program coordinators comment that they have to follow strict government

regulations on the exams as well. All study programs contain various assessment methods, which include next to written exams also group works, presentations and reports (especially for practical courses). Nevertheless, the experts consider the amount of oral exams being very low in the three study programs, which the program coordinators explain with the high number of students in one class. They add that in the electives modules, where the student numbers vary between ten to fifteen, oral exams are more common. In the compulsory courses, however, the number of students often ranges between 70 and 80, which would create a heavy workload for the lecturers. To specify, the experts ask if it is possible to finish the bachelor without taking an oral exam. The program coordinators confirm that it would be possible if you exclude the defense of the final project as an oral exam. The experts acknowledge the problem to conduct oral exams in large classes and accept the explanation from the program coordinators.

The program coordinators explain the expert panel that if students are unable to join the exam, they need to prove their illness with a certificate from a hospital or doctor. In the following two weeks, the students are allowed to take the exam, which allows them to receive their grades several weeks after the final exam at latest. The experts raise the question what happens if the students are ill for a longer time. The program coordinators admit that there are currently no regulations for such cases. In their opinion, they consider it problematic that the exam scores need to be send to the ministry in accordance with a strict deadline. It might be possible to submit data later if the new semester has not started yet. They add, that they will clarify the government regulation in this regard, which satisfies the experts. They continue to ask what happens if students fail the exam or a semester. The program coordinators admit that there is currently no detailed regulation at ITK that regulates the procedure for failing an entire semester. Normally if students fail one exam, they are allowed to repeat this exam. Therefore, students would have to fail all exams in order to repeat an entire semester.

The students comment that the exams vary depending on the module and the lecturer. The lecturer can allow them to re-take the exam if they failed or did not perform as good as they hoped. If they fail, the lecturer first contacts them to explain why they failed and where they need to improve. Once they receive this explanation, they consider it easier to improve in this subject. Instead of re-taking the exam, some lecturers might also offer additional tasks or assignments to compensate the negative exam results. They confirm that re-sits take place within a two-week window after the initial exam date.

In conclusion, the experts have gained a positive impression on the exam system at ITK. The exams are devised to individually measure to which extent students have reached the learning outcomes in each module. The experts confirm that the exams are structured to

cover all of the intended learning outcomes (knowledge, skills and competences). The experts validate that all three study programs under review include a thesis or final project, which ensures that all students work on a set task independently. The experts have learned that the lecturers apply various assessment methods, which are clearly explained to the students in person and in the module handbooks. In addition, the experts consider that the number and distribution of the exams are adequate and that all exams are organized in a way to avoid delays to student progression caused by deadlines, exam correction times, resits etc. Furthermore, the grading follows transparent criteria. Nevertheless, if students disagree with the lecturer's work, they have a possibility to appeal the result.

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

[…]

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-assessment report
- Staff handbook
- Module handbook of each study program
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The study programs ME and CE are based at the department of Industrial and Process Technology whereas the study program MME is based at the department of Earth and Environmental Science. The staff involved in the organization of the study programs can all be classified as public servants and non-civil servants. Part of the staff at ITK is recruited by the government (public servants) while the institute is responsible for hiring all non-civil servants. Public servants and non-civil servants receive the same benefits at ITK, therefore the sole difference is the source of their income. The minimum requirement for scientific staff is to hold a master degree, although the university aims to hire researchers holding a PhD.

Table 11 Number of Faculty Based on Academic Qualification

Academic Qualification	ME	CE	MME
Doctoral	1	2	1
Master	10	10	11
Ongoing Doctoral Program	3	2	2

The recruitment of new staff includes administrative, psychological review as well as an interview and microteaching demonstration.

The quality assurance of the teaching staff is included in the evaluation of the module at the end of each semester. This is translated into a faculty achievement index, which shows a high satisfaction of the students with their lecturers in the most recent evaluations (ME, CE, and MME are 3.21, 3.39, and 3.16 out of 4.00). Each study program is lead by a program coordinator, who is assisted by an administrative staff. Each laboratory further has a head of the laboratory supported by their laboratory staff to manage the learning processes during classes and to maintain the materials and equipment. Every member of the scientific staff is further involved in research activities, predominately in the fields of food and energy. The institute supports the research with scientific grants and encourages their staff to conduct collaborative research. Various scientific projects represent collaborative activities between ITK, other universities and industries. Moreover, ITK releases incentives when staff members publish in reputable international journals.

In the study program ME, fourteen permanent faculty members are active. All staff members have passed pedagogic training before entering their teaching responsibilities. Although the number of PhD holders is currently low, the university ensures that several of their staff members are currently pursuing a higher degree at national and international universities. Several of the staff members are also engaged in collaborative projects with industry partners. Similarly, the CE study programs involved fourteen scientific staff members. Two out of these fourteen are holding a PhD degree from an international university, whereas two are currently seeking to finish their doctoral studies. The main fields of research are inside the fields of energy as well as food and agriculture. Furthermore, the CE program provides opportunities for students to participate and contribute to research, especially those who take research courses in semester seven. The workload from the staff members strongly varies with an average of 11.68 sks and a maximum number of 24 sks. The scientific staff from the study program MME has one faculty member with a doctorate as well as two members, who are currently conducting their PhD education abroad. The study program is supervised by a program coordinator while the laboratories are jointly

managed by the Department of Earth and Environmental Science. The main scientific competences of the staff of MME are environmentally friendly materials, waste utilization technology, manufacturing process, and advanced materials. The research staff obtained scientific grants from ITK, the ministry of education and elsewhere. Students are often integrated into the research activity of the staff members, which has led to joint publications in national and international journals. The maximum workload of the teaching staff in the study program MME is 16 sks; staff members who take over other responsibilities and positions can reduce their teaching load. Visiting guest lecturers are invited on a regular basis; such events take places three times a year and shall enhance the students' knowledge by scientists from national and international universities.

The experts inquire how the university combines research and teaching. The representatives of the rector's office explain that they have young and talented lecturers, which might have only little experience in teaching in some cases. Nevertheless, everyone is encouraged to submit research proposal for national funding and conduct research and integrate their research in the lectures. However, mainly students are actively involved in these research projects. In addition, ITK supports the research of its scientific staff members with internal grants, which also apply for students' research activities. The students are also encouraged to join scientific work in extracurricular activities, for which they can also receive credit points. Students are further able to suggest research ideas to their lecturers, which can get involved in collaborations with companies. The representatives of the rector's office remark to the expert panel that these grants are also available for researchers without a PhD degree.

Moreover, the expert panel is interested in ITK's strategy to recruit new staff. The representatives of the rector's office remind the experts that ITK is a state university and therefore has to strictly follow governmental regulations. There are three categories of state universities in Indonesia, and ITK has not reached the level of a semi-autonomous or autonomous university, which would guarantee them a higher degree of independency. The current situation at ITK allows them to propose the government the number of new lecturers they wish to hire. The hiring process follows government regulations. Every candidate needs to be approved by the government, who also has the final decision in whom to offer the job. The procedure usually starts with offering the job opportunities only to PhD holders; if no suitable application was submitted, the same position can also be opened for individuals having a master's degree.

The experts further discuss the workload of the staff members. They admit that their current workload can be divided into 2:1:1, which represents two for teaching whereas one for community service and one for research. They specify that research can also be done within the community service, such as co-operations with companies. This transfer to a

minimum of five credits for lecturing, three credits of community service, and three credits of research. Additional hours are decided individually. Young staff members need to have one supervising senior lecturer, which can be inside or outside the ITK campus. Alternatively, or in addition, they can form research groups within a department, which is the most common case. Students are often involved in research.

In conclusion, the experts consider the scientific orientation and qualifications of the teaching staff are sufficient to teach the bachelor program under review. With the number of the current staff members it is possible to provide assistance and advice to students, complete all administrative tasks and do all necessary teaching and community service next to research. The research and development activities carried out by the teaching staff are in line with and support the level of academic qualification aimed at. Nevertheless, the experts consider the number of scientific staff members should be increased in order to allow the staff members to complete their own personal development and allow them to conduct research, write scientific publications and apply for external funding with the industry and research funds (see discussion criterion 4.3). The experts indicate to the university that at least one professor should be available in each study program in order to have full access to grant money. Therefore, the experts would welcome that ITK develops a concept how to attract and appoint professors to ITK within the next five years.

Criterion 4.2 Staff development

Evidence:

- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:
According to the self-assessment report, ITK strongly encourages the scientific staff members to continue their professional development. This includes a mandatory didactic training for new academic staff members that encompasses curriculum design, teaching material, and innovative teaching and learning methods. Moreover, workshops are held to refresh and to deepen various didactic competences in each semester. The lecturers can also regularly participate in external didactical trainings offered and funded by the government.

ITK further supports their scientific staff members in continuing their higher education in their doctoral studies. Since many staff members search to do their PhD at an international institution, the university offers language courses in English to improve the oral and writing skills to help them in their applications and international publication activity.

The representatives of the rector's office explain to the experts that they are aware of their need for more PhD staff members and professors. They describe that they assist their staff in continuing their higher education and therefore receiving a promotion. As one tool, ITK offers language courses and support the international collaborations for research. In the opinion of the representatives of the rector's office, ITK should support every current staff member in becoming a full professor. The teaching staff is further encouraged to study abroad or to participate in workshops and short courses. ITK offers funding schemes to facilitate the attendance of their staff members. In addition, competency certificates can also be obtained with financial support of ITK. In the field of ME, these certificates include Quality Auditor, Occupation Health and Safety, Institution of Engineer Indonesia or others. Examples for certificates of the members of the CE study programs are Water Pollution Controlling, Toxic and Hazardous Waste Controlling or an Internal Quality Auditor certification. Scientific staff members of the MME program received certificates as a welding inspector, general work safety expert and internal auditor.

The experts continue to raise the topic on support for newly hired staff. The representatives of the rector's office confirm that young lecturers receive a basic pedagogic training to enrich their teaching experience. ITK offers its own educational program, in which 42 staff members are currently participating. In this program, the newly hired staff members learn how to create a module, how to involve modern teaching materials and among other things how to create videos for teaching. In addition, pedagogic experts are also invited from well-established universities such as the Technological University in Surabaya or the Indonesia University in Jakarta, to give the staff members advanced training in pedagogy. The representatives of the rector's office add that they also support the lecturers to attend international workshops and courses, which is organized on an individual basis. As one example, they name one person recently joined a workshop on renewable energy in Australia. The expert panel further asks if it is possible for staff members to spend longer stay abroad, which the representatives of the rector's office confirm. They state that the staff members of ITK can spend one to two semesters at another campus or in the industry if it benefits their personal and career development. The teaching staff confirms that they are aware their personal opportunities to spend time in companies. They state that receiving an industry lectureship or internship is not easy as these are very competitive.

The experts discuss the topic on staff development further with the teaching staff. At the moment, the MME program currently has only one lecturer with a PhD, whereas the CE program as two and the ME program has also only one. All of those, who have not yet earned a PhD, want to continue their higher education and earn a PhD. Currently, only one is enrolled in a doctoral program and another one is waiting to be accepted in a PhD pro-

gram. All others are looking for opportunities. The teaching staff explains that it is sometimes challenging to find a suitable PhD supervisor in Indonesia. For example, in the ME field, there are only four institutions in Indonesia; thus finding a suitable person in the field of their studies can take time. For an international PhD program, the teaching staff would require a higher number of international publications. Therefore, their strategy focuses on publishing scientific articles in high quality journals in order to have a competitive CV for scholarships abroad as well as in Indonesia. The teaching staff states that ITK supports their employees with publishing. The ITK regulations suggest publishing one scientific work each year, which should be at least in a Q3 listed journal. The teaching staff considers one of their main obstacles to be successful is their level of English language. They have access to improve their English from the government and ITK, which they highly appreciate in their development. This includes classes on writing English research proposals and applications. They admit that having experience researchers at ITK would help them in their development; however, Balikpapan is not yet attractive enough for successful professors, who mainly want to remain on Java.

The students remark to the expert panel that they would wish to have more lecturers, especially in the study program ME. Currently, one lecturer supervises four to five students, which takes a lot of their time. In addition, they voice the demand for lecturers with a PhD, who have more experienced in science and research. The students from the MME program add that they would also want to have more industry partnerships. At the moment, ITK has only five partnerships suitable for the MME program to do internships, which they wish to expand in the future. The experts address this topic with the teaching staff, who would support new recruitments at ITK in their fields. They add that this often makes it difficult for them to continue their education as most lecturers already have a high teaching load and it would be impossible for others to take over their classes if one stays away for a semester or more.

The experts confirm that ITK offers and supports their scientific staff members in their development including programs on pedagogy. This includes possibilities to continue their higher education and pursue a doctoral degree. The experts recognize the lecturers as young and motivated with a great desire to earn a PhD in the future. The experts strongly support the continuation of the higher education of the staff members and therefore ask the university to present a concept for staff development in order to promote the current staff. This should include sufficient staff member to take over the teaching load of individual researchers, who might need to spend time outside ITK to perform their research.

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment report
- List of cooperation agreements
- Visitation of the laboratories
- Discussion during the audit

Preliminary assessment and analysis of the experts:
ITK is a public university, which receives annual funding form the Ministry of Education as well as the student tuition fees. This money is mainly used to cover salaries, facility maintenance and routine expenses as well as continous development of the campus. ITK has successfully applied for additional funding from the ministry in order to expand the campus facilities. Scientific grants are offered by ITK, whereas the scientific staff of ITK further receives funding from governmental grants and collaborations with companies.

The campus from ITK is located in northern Balikpapan, where the facilities are continuously expanded since 2015. The total area covers more than 300 ha and includes six buildings, one dormitory and several building under construction. Classrooms are all equipped with modern technology and WIFI access and fit 40, 60 or 80 students. In addition, ITK has an integrated laboratory building providing equipment such as XRD, XRF, GC, SEM, SAA, FTIR, UV VIS, and other instrument for experiments. ITK additionally operates a library, and language center and other supporting facilities.

ITK collaborates with several strategic partners in Indonesia and abroad. A list of collaboration partners is submitted as an appendix to the self-assessment report showing memorandums of understanding with leading universities inside Indonesia (e.g. Gadjah Mada University, Institut Teknologie Sepuluh November) and international institutions (e.g. Politecnico Milano, Saga University).

The students mention to the expert panel that they consider the laboratory faculties in MME could be improved. This includes the quantity of laboratory equipment, such as the milling machine, which all students need to use in the practicum. Currently, there is only one machine, which operates with a long schedule. Students from the CE study program add that they would also appreciate more equipment in the laboratories as well, in particular microscopes. The teaching staff in CE comments that they have also enough laboratories in chemistry, however, they would wish to have additional laboratory classes in chemical engineering. In the program ME, the teaching staff acknowledges similar problems. They mention that they have an established collaboration with the institute “State Polytechnic Balikpapan” and several companies in order to train their students for their future occupations.

Overall, the teaching staff considers that there is enough funding available for their research; nevertheless, they aim to expand their collaborations with other universities and the industry. They can apply for research grants at international and governmental level; additional options include the Borneo grant for research. However, the teaching staff acknowledges that several grants are only available for researchers holding a PhD. This is why collaborations are essential at the moment in order to improve their research capabilities. Collaboration and funding from the industry is mainly available for staff members holding a master degree; still, it is not easy to receive grants from the industry. The teaching staff mentions that the missing equipment is not ideal; however, ITK has a schedule to continuously expand the laboratories and facilities. The representatives of the industry support the strategy and consider an increased collaboration as beneficial for both sides. Representatives from the industry add that they are very supportive of ITK and want them to develop for their future. Therefore, they are currently establishing a sponsorship for a competition at ITK, where they support a student association.

In addition, the students remark that the facilities of the campus need several improvements. They mention that the university has no leisure area. Further, they join sports competition, yet there are no sports areas on campus. Moreover, the students have no opportunities in campus to buy food and no public transportation is available to the city. Therefore, they suggest improving the student life at ITK by expanding the campus facilities further.

In summary, the experts consider the available funds and equipment adequate to provide a solid basis for the degree programs. However, the research facilities should be expanded in order to suit the number of students in the study programs. This includes new equipment or access to laboratories, which allow the students and staff members to perform up-to date research. In addition, the experts further support improvements on campus, which include in particular access to a canteen, working spaces for students, a library, sports facilities and transport opportunities from and to the campus. In the opinion of the expert panel, these improvements would strongly benefit the students and staff members on campus.

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

IT has submitted a detailed statement on the criterion 4.1 and 4.2 to elaborate on the issues of staff and staff development.

Ad criterion 4.1.

ITK clarifies that their scientific staff members are engage in four activities (not three as wrongly stated in the report). Each is the staff members is involved in teaching, research, community service and supporting activities. In total, the workload of each academic staff member is twelve credits, where at least one for community service, at least one for supporting activities and the remaining nine credits are split into teaching and research.

In their statement, ITK ensures that they have access to external funding even though their low numbers of professors. They explain that funding is available to all lecturers and gives examples of grants of their junior lectures.

ITK further states, that hiring new staff, including professors, is strictly controlled by the Indonesian government. Instead of hiring professors, ITK is actively working to expand its collaborations with external stakeholders, other universities and industry partners.

Regarding the requirement A1, the experts acknowledge the comments from ITK about the current staff in these programs. The experts continue to recommend further develop the current staff to a higher level and to integrate professors in the study programs to foster high quality research and training.

Ad criterion 4.2.

ITK adds to the publication strategy outlined in the in the accreditation report. They specify that according to their regulations, every lecturer needs to demonstrate their research work annually; publications is only required every three year. The type of required publication depends on the academic status of the lecturer based on the following overview:

No	Academic Position	Responsibility in each 3 years
1	Junior Lecturer	1 book or journal
2	Assistant Professor	1 book or journal
3	Associate Professor	3 national accredited journal or 1 international journal
4	Full Professor	3 national accredited journal or 1 reputable international journal

The experts did not issue any requirements or recommendations on this issue.

Furthermore, ITK describes that they are already working on supporting their scientific staff with pursing their PhD, mentioning several members going abroad to finish their doctoral studies in order to return and continue their reaching. ITK insists that all lecturers have sufficient competences to teach the three bachelor programs under review.

The experts confirm that the current staff has suitable competences to leach in these programs; nevertheless the outgoing of staff members to pursue their PhD would cause shortages in teaching. Thus, the experts aim to ensure sufficient teaching capabilities due to absence of PhD candidates during their studies abroad by additional lecturers.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-assessment report
- Module handbook of each study program
- Webpage “Mechanical Engineering” https://me.itk.ac.id/en
- Webpage “Chemical Engineering” https://che.itk.ac.id/en
- Webpage “Materials and Metallurgical Engineering” https://mme.itk.ac.id/en
- Discussion during the audit

Preliminary assessment and analysis of the experts:
ITK submits the module handbook of each study program under review as an appendix to the self-assessment report. These module handbooks are additionally available on the webpages of the study programs.

The experts conclude that the module descriptions reflect the curricula adequately and contain meaningful information about the individual modules. In particular, the descriptions provide comprehensive information about the persons responsible for each module, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the applicability, the admission and examination requirements, and the forms of assessment, and details explaining how the final grade is calculated.

The students confirm to the experts that all information on courses is available online in their university system. They add that details concerning examinations and contents are provided by the teaching staff at the beginning of each course and are available in their syllabus online. However, the experts observe certain inconsistencies in the module handbooks. This includes the use of different templates (even within one module handbook) and the use of different terminology (e.g. credit points, CP and sks). The experts therefore suggest improving the module handbook of each study program following one uniform template and terminology. In addition, the module handbook needs to clearly present the

total workload of each module (lectures, practical work, as well as, assignment and self-study).

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample Diploma Certificate for each degree programme
- Sample Transcript of Records for each degree programme
- Sample Diploma Supplement for each degree programme

Preliminary assessment and analysis of the experts:
After graduation, ITK issues a diploma, a diploma supplement as well as a transcript of records.

The experts confirm that the students of the three degree programmes under review are awarded these three documents after graduation. The Transcript of Records lists all courses the graduate has completed, the achieved credit points, grades, and cumulative GPA. The Diploma Supplements are bilingual (Indonesian and English). The Diploma Supplement and the Transcript of Records contain necessary information about the respective degree programme; however, information needs to be added. The Diploma Supplement must contain detailed information about the access requirements of the degree programmes. Therefore, the experts advise ITK to include this information in the Diploma Supplements. Furthermore, the experts note that neither the Transcript of Records nor the Diploma Supplement contains the conversion of sks points into ECTS points. The Diploma documents need to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree programme. The experts highlight that the Diploma Supplement needs to follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Reports
- All relevant regulations on the studies, examination, admission and quality assurance are published on the university's website
- ITK main webpage https://itk.ac.id/en/
- Webpage "Mechanical Engineering" https://me.itk.ac.id/en

- Webpage “Chemical Engineering” https://che.itk.ac.id/en
- Webpage “Materials and Metallurgical Engineering” https://mme.itk.ac.id/en
- Discussion during the audit

Preliminary assessment and analysis of the experts:
ITK has issued statutes, which contain the basic regulations and serve as a reference in planning, running, and developing mechanical engineering, chemical engineering, and materials and metallurgical engineering study programs. In addition, ITK has regulation concerning among others the identity of the institution, the implementation of education and other employees and community service. Rules and regulations are further issued for students, which apply equally for international and national students.

In the discussion between the expert panel and the program coordinators, they confirm that the regulations are published on the webpage to be accessible to everyone. In addition, the students are informed at the beginning of the semester about the relevant rules and regulations at ITK.

The experts confirm that the rights and duties of both ITK and the students are clearly defined and binding. All rules and regulations are published on the university’s website in Indonesian as well as in English and hence available to all stakeholders. In addition, the students receive all relevant course material in the language of the degree programmes at the beginning of each semester.

The experts confirm that the rights and duties of both the higher education institution and students are clearly defined and binding. Further, all relevant course-related information is available in the language of the degree programme and accessible for anyone.

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

Ad criterion 5.1.

ITK accepts the suggestions of the experts to improve the module handbook by creating one documents with identical templates for all modules to increase the consistency of the handbook. Until ITK submits an updated module handbook with the necessary additional information for the three study programs under review, the requirement A3 remains in place.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Internal Quality Audit Reports for each degree programme
- Rectorate Decree of Internal Quality Assurance System
- Academic regulations
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The quality assurance at ITK is coordinated by the Quality Assurance Center, which was established in 2019. It is directly subordinated to the rector and it is supervised by the vice rector. The quality assurance relies on an internal as well as an external system.

The external quality assurance focuses on national and international accreditations. Every degree programme and every higher education institution in Indonesia has to be accredited by the national Accreditation Agency (BAN-PT). ITK as an institution as well as the three degree programmes under review have received the accreditation status B (good) from BAN-PT.

The internal quality assurance encompasses all activities focused on implementing measures for improving the teaching and learning quality at the university. The Center of Quality Assurance conducts regular scans of academic and non-academic quality criteria within the institution. Apart from this office, there are different quality assurance units in place, such as the Department's Quality Assurance Group and the internal quality auditor group. Different measures are taken to gather information about a variety of qualitative aspects of the institution.

On the institutional level, ITK annually carries out an evaluation of ten standards concerning management, resources, strategic development, and quality assurance procedures. The performance of the departments is continuously checked through a specific information system. There is a major curriculum revision process for each programme every five years whereas a minor one every year. The graduates are followed by ITK through a regular tracer study conducted by the career centre. Internal and external stakeholders give input

through these processes in various ways. ITK conducts several surveys among their students as well as among alumni to ensure the satisfaction and employability of their graduates.

In addition, students are invited to take part in an evaluation of each module at the end of each semester. The questionnaires are filled out online in other to improve the course. These include questions with respect to the courses in general and about the teachers' performance. The discussion with the students revealed that students have the impression that their comments are taken into consideration with regard to the further improvement of the programmes. As a consequence, there are small adaptions made in the curriculum each semester. The results of the course evaluation are centrally assessed and analysed before they are communicated to the Head of Department, who is responsible to initiate any measures if problems or needs for improvement are detected. A summary of the results is made accessible to the students. In case the satisfaction of the students with staff members is deficient, the Heads of Department will contact the respective teacher, discuss the issue, and propose solutions. If no improvement can be achieved over a longer period, the staff member will be dismissed. Thus, the experts agree that the quality management circles at ITK are well established and work under participation of all stakeholders.

In the discussion with the representatives of the rector's office, they confirm to the experts that stakeholders are involved in the quality assurance of the study programs. This includes alumni, collaborating industry partners, professional associations, and private academics. They further explain that students are also members of the important decision making boards. The industry representatives confirm in the discussion that the university is eager to receive feedback about new developments and trends and the employability of their graduates. In this context, the experts positively remark on the installed advisory board consisting of government, alumni, different associations, students, and other stakeholders who are involved in modifying and improving the curricula of the degree programs.

The representatives of the rector's office explain that they not conduct annual meetings at the beginning of August in order to conduct an internal audit of each unit and decide on strategies on how to improve. They consider the main performance indicators of each program, which include among other things, the satisfaction of alumni, feedback from collaborations in the industry and other research institutions and community service.

Moreover, the experts notice that in the years 2020 to 2021, the results of the evaluations strongly improved. Therefore, they ask which measurements were taken to increase the satisfaction on campus. The representatives from the rector's office describe that they redeveloped their evaluation system during the last view years. This resulted in an increase in satisfaction.

The program coordinators describe to the experts that the current success rate in the three study programs under review lies around 80–85%; however, several students already find jobs before graduation and therefore leave before finishing their bachelor degree. The number of drop-out students due to failed exams currently is only about 1 to 5 students in the last few years. The average time to finish their studies lies currently at 4.5 semesters with ME, 4.13 with MME, and 4.08 with CE.

In conclusion, the experts are satisfied with the quality management system at ITK, especially with the continuous feedback loops and the involvement of important stakeholder groups such as students, alumni, and representatives from the industry. They confirm that the programs under review are subject to regular internal quality assessment procedures aiming at continuous improvement. All responsibilities and mechanisms defined for the purposes of continued development are binding. The outcomes and all measures derived are made known to external and internal stakeholders, who are involved in this process. All methods employed and data analysed are suitable for the purpose and used to continue improving the degree programme, especially with a view to identifying and resolving weaknesses. The experts confirm that the quality assurance monitors if the intended learning outcomes are achieved, if the academic programs are still feasible and up to date, and the qualification profile of the graduates matches the job market.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution (22.08.2023)

The following quotes the comment of the institution:

Criterion 1.3 Curriculum

Response: (1)	In accordance with peer suggestion about small improvements should have been considered from alumni and industrial partners. 1. In the program CE, they would consider it beneficial to learn more on safety in the laboratories as well as quality control in the laboratories. 2. In the program ME, alumni would wish to have even more practical courses in order to prepare them for their future jobs. Therefore, they suggest the curriculum needs to include an internship for all students. ITK will consider it good feedback for curriculum amendment next year. ITK will follow up on whether it will be included in the curriculum or an additional program outside it.
Evidence:	Curriculum amendment activity is included at Summative Curriculum Evaluation scheduled at 2024 as regulated by Curriculum Development Guidelines (Appx B.1.a) https://1drv.ms/b/s!AupxdCcDZ21qtXIQqQwZbukKtXY_?e=rHyral

Criterion 2.1 Structure and modules

Response: (2)	In accordance with peer question about the "amount of electives is low with numbers below 10%" and "there are many modules with less than five ECTS credit points". It is normal in Indonesia having 4.5 ECTS For Compulsory courses, but we will consider adopting the recommendation to increase the load above 5 ECTS in the next curriculum.
Evidence:	-

Criterion 4.1 Staff

<table>
<tr><td>Response:
(3)</td><td>In accordance with peer statement about “staff’s current workload can be divided into 2:1:1, which represents two for teaching whereas one for community service and one for research. They specify that research can also be done within the community service, such as co-operations with companies. This transfer to a minimum of five credits for lecturing, three credits of community service, and three credits of research.”
We wish to clarify the statement: In each semester, a lecturer must have activity equivalent to a minimum of twelve (12) credits, distributed among four (4) components: teaching, research, community services, and supporting activities. Those twelve credits are regulated as follows:
<table>
<tr><th>No</th><th>Component</th><th>Activity</th><th>Credits</th></tr>
<tr><td>1</td><td>Teaching</td><td>Teaching in class, supervising and examining of final project, personal development, etc</td><td rowspan="2">≥ 9 sks (combination of Teaching and Research)</td></tr>
<tr><td>2</td><td>Research</td><td>Researching, publishing journal and book, etc.</td></tr>
<tr><td>3</td><td>Community Services</td><td>Social empowering, occupy position in government, etc</td><td>> 0 sks (atleast one activity)</td></tr>
<tr><td>4</td><td>Supporting Activities</td><td>ad hoc committee in university, member of professional association, etc</td><td>> 0 sks (atleast one activity)</td></tr>
<tr><td colspan="3">TOTAL</td><td>≥ 12 sks</td></tr>
</table>
</td></tr>
<tr><td>Evidence:</td><td>-</td></tr>
</table>

Criterion 4.1 Staff

Response: (4)	In accordance with peer suggestion about "the university that at least one professor should be available in each study program in order to have full access to grant money." We responded to have grant money for research; the lecture must meet some of the requirements. Although there are yet to be professors in each study program, every lecture still has an opportunity to gain grant research. The ministry also allows new lecturers to cooperate with industry, local government, or another university to apply for grant money. Several of us who are still junior lecturers have been granted external funding, for example, Fadhil Muhammad Tarmidzi (PT. Pertamina Hulu Mahakam), Ade Wahyu Yusariarta (Kedaireka), and Asful Hariyadi (Gran Riset Sawit). And another statement about "Therefore, the experts would welcome that ITK develops a concept how to attract and appoint professors to ITK within the next five years." "While the government strictly limits ITK's recruitment of official Professors, we are planning strategically to enhance our collaborations with external stakeholders, other universities, and industrial partners."
Evidence:	-

Criterion 4.2 Staff development

<table>
<tr><td>Response:
(5)</td><td>In accordance with peer statement about "The ITK regulations suggest publishing one scientific work each year, which should be at least in a Q3 listed journal."

In fact, the lecture is not limited to publishing scientific reports, which take effect in rising academic positions. But according to the regulation, every lecturer must have one research activity annually, and every three years, one published journal must be published. The responsibility is different based on the academic position.
<table>
<tr><th>No</th><th>Academic Position</th><th>Responsibility in each 3 years</th></tr>
<tr><td>1</td><td>Junior Lecturer</td><td>1 book or journal</td></tr>
<tr><td>2</td><td>Assistant Professor</td><td>1 book or journal</td></tr>
<tr><td>3</td><td>Associate Professor</td><td>3 national accredited journal or 1 international journal</td></tr>
<tr><td>4</td><td>Full Professor</td><td>3 national accredited journal or 1 reputable international journal</td></tr>
</table>
To support the lecture, ITK gives an incentive for the published scientific work, which is different at each level of publication.</td></tr>
<tr><td>Evidence:</td><td>-</td></tr>
</table>

Criterion 4.2 Staff Development

<table>
<tr><td>Respo
nse:
(6)</td><td>As of 01 April 2023 (in addition to Mr. Andi Idhil Ismail, PhD), Mrs. Dr. Eng. Devy Setiorini Sa'adiyah already return and active in academic activities within ME study program. Furthermore, to maintain and increase PhD number, we also include other PhD holders from other study program to teach in ME. We ensure that all lecturers from other study programs involved have competencies related to Mechanical Engineering.</td></tr>
<tr><td>Eviden
ce:</td><td>1. Profile of Mrs. Dr. Eng. Devy Setiorini Sa'adiyah on ITK's page https://me.itk.ac.id/profile/dosen/detail-en/dr-eng-devy-setiorini-saadiyah-st-ms
2. Profile of Mrs. Dr. Eng. Devy Setiorini Sa'adiyah on Ministry of Higher Education Database https://pddikti.kemdikbud.go.id/data_dosen/NTY4RkFFOUYtRjVGMS00MThBLUI1QUItMDY1RTEzOEQ3ODYz</td></tr>
</table>

	3. Summary of involved PhD holder in teachings of last Semester 2022/2023 https://1drv.ms/b/s!AupxdCcDZ21q7Xi6tqq33F7cViHL?e=35rzlo 4. Rectorate Decree as evidence of a PhD holder's teaching assignment for the last semester of 2022/2023. https://1drv.ms/b/s!AupxdCcDZ21q7XcKkHhhF0jdL1ES?e=QLauC9

Criterion 5.1 Module description

Response: (7)	In accordance with peer statement about "improving the module handbook of each study program following one uniform template and terminology. In addition, the module handbook needs to clearly present the total workload of each module (lectures, practical work, as well as assignment and self-study)." The program study will recheck the consistency of the module handbook via academic monitoring and evaluation each semester. The improvement will be taken in the next year when the curriculum will be amended.
Evidence:	-

F Summary: Expert recommendations (28.08.2023)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mechanical Engineering	With requirements for one year	30.09.2029	–	-
Ba Chemical Engineering	With requirements for one year	30.09.2029	–	-
Ba Material and Metallurgical Engineering	With requirements for one year	30.09.2029	–	-

Requirements

A 1. (ASIIN 4.2) Ensure the compensation of teaching capabilities due to absence of PhD candidates during their studies abroad by additional lecturers.

A 2. (ASIIN 5.1) Increase of the transparency of the module descriptions for the students in the module handbook to clearly present distribution of lecture, practical work, assignments and self-study of the total workload.

A 3. (ASIIN 5.2) The Diploma Supplement should follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide. The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree program.

A 4. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the access requirements of the degree programs.

Recommendations

E 1. (ASIIN 1.1) It is recommended to empower the advisory board to strengthen the feedbacks from industry regarding the study aims and qualification profile.

E 2. (ASIIN 1.3) It is recommended to include more laboratory classes in the curriculum to enable the students to gain more practical experience on campus.

E 3. (ASIIN 4.1) It is recommended to further develop the current staff to a higher level and to integrate professors in the study programs to foster high quality research and training.

E 4. (ASIIN 4.3) It is recommended to expand the research facilities at ITK.

E 5. (ASIIN 4.3) It is recommended to improve the campus facilities for students including in particular canteen, working space, library, sports facilities and transport.

G Comment of the Technical Committees

Technical Committee 01 – Mechanical Engineering/Process Engineering (08.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the assessment of the auditors in general. The committee suggests combining the two requirements regarding the diploma supplement.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mechanical Engineering	With requirements for one year	30.09.2029	–	-
Ba Chemical Engineering	With requirements for one year	30.09.2029	–	-
Ba Material and Metallurgical Engineering	With requirements for one year	30.09.2029	–	-

Requirements

A 1. (ASIIN 4.2) Ensure the compensation of teaching capabilities due to absence of PhD candidates during their studies abroad by additional lecturers.

A 2. (ASIIN 5.1) Increase of the transparency of the module descriptions for the students in the module handbook to clearly present distribution of lecture, practical work, assignments and self-study of the total workload.

A 3. (ASIIN 5.2) The Diploma Supplement should follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide. The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree program. Ensure that the Diploma Supplement contains detailed information about the access requirements of the degree programs.

Recommendations

E 1. (ASIIN 1.1) It is recommended to empower the advisory board to strengthen the feedbacks from industry regarding the study aims and qualification profile.

E 2. (ASIIN 1.3) It is recommended to include more laboratory classes in the curriculum to enable the students to gain more practical experience on campus.

E 3. (ASIIN 4.1) It is recommended to further develop the current staff to a higher level and to integrate professors in the study programs to foster high quality research and training.

E 4. (ASIIN 4.3) It is recommended to expand the research facilities at ITK.

E 5. (ASIIN 4.3) It is recommended to improve the campus facilities for students including in particular canteen, working space, library, sports facilities and transport.

Technical Committee 05 – Materials Science, Physical Technologies (12.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the requirements and recommendations proposed by the expert panel and follows the assessment of the expert group without changes.

The Technical Committee 05 – Materials Science, Physical Technologies recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Material and Metallurgical Engineering	With requirements for one year	30.09.2029	–	-

Requirements

A 1. (ASIIN 4.2) Ensure the compensation of teaching capabilities due to absence of PhD candidates during their studies abroad by additional lecturers.

A 2. (ASIIN 5.1) Increase of the transparency of the module descriptions for the students in the module handbook to clearly present distribution of lecture, practical work, assignments and self-study of the total workload.

A 3. (ASIIN 5.2) The Diploma Supplement should follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide. The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree program.

A 4. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the access requirements of the degree programs.

Recommendations

E 1. (ASIIN 1.1) It is recommended to empower the advisory board to strengthen the feedbacks from industry regarding the study aims and qualification profile.

E 2. (ASIIN 1.3) It is recommended to include more laboratory classes in the curriculum to enable the students to gain more practical experience on campus.

E 3. (ASIIN 4.1) It is recommended to further develop the current staff to a higher level and to integrate professors in the study programs to foster high quality research and training.

E 4. (ASIIN 4.3) It is recommended to expand the research facilities at ITK.

E 5. (ASIIN 4.3) It is recommended to improve the campus facilities for students including in particular canteen, working space, library, sports facilities and transport.

H Decision of the Accreditation Commission (22.09.2023)

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

The accreditation commission discussion the recommendations of the experts and the Technical Committees and follows the changes of Technical Committee 01 without any further changes.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Mechanical Engineering	With requirements for one year	30.09.2029	–	-
Ba Chemical Engineering	With requirements for one year	30.09.2029	–	-
Ba Material and Metallurgical Engineering	With requirements for one year	30.09.2029	–	-

Requirements

Requirements

A 1. (ASIIN 4.2) Ensure the compensation of teaching capabilities due to absence of PhD candidates during their studies abroad by additional lecturers.

A 2. (ASIIN 5.1) Increase of the transparency of the module descriptions for the students in the module handbook to clearly present distribution of lecture, practical work, assignments and self-study of the total workload.

A 3. (ASIIN 5.2) The Diploma Supplement should follow the European template and needs to include statistical data about the distribution of final grade according to the ECTS Users' Guide. The Transcript of Records needs to list the acquired ECTS points of each course and how many ECTS points are awarded for the whole degree program. Ensure that the Diploma Supplement contains detailed information about the access requirements of the degree programs.

Recommendations

E 1. (ASIIN 1.1) It is recommended to empower the advisory board to strengthen the feedbacks from industry regarding the study aims and qualification profile.

E 2. (ASIIN 1.3) It is recommended to include more laboratory classes in the curriculum to enable the students to gain more practical experience on campus.

E 3. (ASIIN 4.1) It is recommended to further develop the current staff to a higher level and to integrate professors in the study programs to foster high quality research and training.

E 4. (ASIIN 4.3) It is recommended to expand the research facilities at ITK.

E 5. (ASIIN 4.3) It is recommended to improve the campus facilities for students including in particular canteen, working space, library, sports facilities and transport.

Appendix: Programme Learning Outcomes and Curricula

According to appendix to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the bachelor degree programme Mechanical Engineering:

Program Educational Objectives

1	Have knowledge and competencies for careers and jobs in mechanical engineering.
2	Able to work in teams, communicate effectively with different scientific backgrounds, and become a leader.
3	Able to take responsibility for work by applying professional ethics, especially in solving problems in the field of mechanical systems.

Indented Learning Outcomes

1	an ability to communicate effectively in oral and written manners with a range of audiences;
2	an ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective;
3	an ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives;
4	an ability to apply Pancasila values, ethical and professional responsibilities;
5	an ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies;
6	an ability to identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics in mechanical systems in in global, economic, environmental, and societal contexts;
7	an ability to model, analyze, design, and realize physical systems, components or processes using appropriate materials by utilizing information technology; and

8	an ability to develop and conduct experiment, analyze, and interpret data, and use engineering judgment to draw conclusions.

The following **curriculum** is presented:

1st Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201209	Calculus I	-	4.53
KU201211	Physics I	-	4.53
KU201101	Pancasila	-	4.53
KU201215	Basic Chemistry	-	3.02
TM201401	Introduction to Mechanical Engineering	-	3.02
TM201402	Engineering Drawing	-	3.02
KU201219	English	-	4.53
		Semester Workload	27.2

2nd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201210	Calculus II	-	4.53
KU201212	Physics II	-	4.53
KU201217	Introduction to Statistical Methods	-	4.53
KU201218	Algorithm and Programming	-	4.53
TM201403	Mechanical Drawing	TM201402	4.53
TM201404	Engineering Statics	-	4.53
		Semester Workload	27.2

3rd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201405	Thermodynamics I	-	4.53
TM201406	Engineering Mathematics	-	4.53
TM201407	Statistics and Probability	-	3.02
TM201408	Strength of Materials	TM201404	6.04
TM201409	Engineering Materials I	-	4.53
TM201410	Engineering Measurements	KU201209 KU201210 KU201211 KU201212 KU201217	4.53

3rd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201411	Fluid Mechanics I	KU201211 KU201212	4.53
		Semester Workload	31.71

4th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU2011XX	Religion	-	3.02
TM201412	Machine Elements I	TM201408 TM201409	4.53
TM201413	Heat and Mass Transfer I	-	4.53
TM201414	Engineering Materials II	TM201409	4.53
TM201415	Fluid Mechanics II	TM201411	4.53
TM201416	Kinematics of Mechanism	TM201404	3.02
TM201417	Thermodynamics II	TM201405	4.53
		Semester Workload	28.69

5th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201320	Resource Utilization	-	3.02
TM201418	Heat and Mass Transfer II	TM201405 TM201417 TM201413	4.53
TM201419	Dynamics and Control Systems	-	4.53
TM201420	Machine Elements II	TM201412	4.53
TM201421	Manufacturing Processes I	TM201409	4.53
TM201422	Numerical Methods	-	4.53
TM201423	Engineering Dynamics	TM201416	4.53
		Semester Workload	30.2

6th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201108	Citizenship		3.02
KU201102	Indonesian	-	3.02
KU2011321	Field Study Service	KU201320	3.02

6th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201424	Mechanical Design	TM201412 TM201420	3.02
TM201425	Finite Element Methods	TM201422	4.53
TM201426	Energy Conversion Engineering	TM201417 TM201418	4.53
TM201427	Manufacturing Processes II	TM201421	4.53
TM201428	Mechatronics	-	3.02
		Semester Workload	28.69

7th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201601	Practical Work	-	3.02
TM201701	Research Proposal	-	3.02
TM201429	Operational Management	-	4.53
TM201430	Mechanical Vibration	TM201423	4.53
TM201431	Electrical Power Engineering	KU201211 KU201212	4.53
TM2015XX	Elective Course 1	-	4.53
TM2015XX	Elective Course 2	-	4.53
		Semester Workload	28.69

8th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM2015XX	Elective Course 3	-	4.53
TM2015XX	Elective Course 4	-	4.53
TM201702	Final Project	-	6.04
		Semester Workload	15.1

Elective Courses			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201501	Pumps and Compressors	TM201426	4.53
TM201502	Heat Exchangers	TM201405 TM201417 TM201413 TM201418 TM201426	4.53
TM201503	Matrix Method for Structural Analysis	-	4.53
TM201504	Machine Tool Design	-	4.53
TM201505	Hydraulics and Pneumatics System	-	4.53
TM201506	Combustion Engine	TM201426	4.53
TM201507	Vehicle Engineering	-	4.53
TM201508	Casting Technology	-	4.53
TM201509	Welding Technology	TM201421	4.53
TM201510	Fracture Mechanics and Failure Analysis	-	4.53
TM201511	Occupational Health and Safety	-	4.53
TM201512	Engineering Economics	-	4.53
TM201513	Materials Selection and Processes	-	4.53
TM201514	Internship A	-	6.04
TM201515	Internship B	-	12.09
TM201516	Internship C	-	18.13
TM201517	Internship D	-	24.18
TM201518	Internship E	-	30.22
TM201519	Internship F	-	36.27
TM201520	Energy Audit	-	4.53
TM201521	Robotic Mechanism	TM201423 TM201428	4.53
TM201522	Mechanical System for Building	-	4.53
TM201523	Computational Fluid Dynamics	TM201411 TM201415 TM201422	4.53
TM201524	Steam Power Plant Engineering	TM201405 TM201417	4.53
TM201525	Heavy Equipment	-	4.53
TM201526	Corrosion	-	4.53
TM201527	Renewable Energy	TM201426	4.53

Elective Courses			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TM201501	Pumps and Compressors	TM201426	4.53
TM201528	Refrigeration Engineering	TM201426	4.53
TM201529	Heat Treatment	TM201409 TM201414	4.53
TM201530	Metal Alloys	TM201414	4.53
TM201531	Maintenance Engineering and Management	-	4.53
TM201532	Operation Research	-	4.53
TM201533	Capita Selecta	-	4.53

According to appendix to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the bachelor degree programme Chemical Engineering:

Program Educational Objectives

1	Prepare the graduates to be a professional, solutive and competitive engineer with the chemical engineering knowledge as well as a good leadership skill and integrity.
2	Produce research to give added values into material or process as well as beneficial and giving solution to the problem faced by community.

Indented Learning Outcomes

1	an ability to communicate effectively in oral and written manners with a range of audiences;
2	an ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective;
3	an ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives;
4	an ability to apply Pancasila values, ethical and professional responsibilities;
5	an ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies;

6	an ability to identify, formulate, and solve mechanical engineering problems by applying principles of engineering, science, and mathematics in mechanical systems in in global, economic, environmental, and societal contexts;
7	an ability to model, analyze, design, and realize physical systems, components or processes using appropriate materials by utilizing information technology, and
8	an ability to develop and conduct experiment, analyze, and interpret data, and use engineering judgment to draw conclusions.

The following **curriculum** is presented:

1st Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201101	Pancasila	-	3.02
KU201209	Calculus I	-	4.53
KU201211	Fundamental of Physics 1	-	4.53
KU201215	Fundamental of Chemistry	-	4.53
KU201219	English	-	3.02
TK201401	Introduction to Chemical Engineering	-	4.53
TK201402	Analytical Chemistry	-	3.02
		Semester Workload	27.2

2nd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201210	Calculus II	-	4.53
KU201212	Fundamental of Physics II	-	4.53
KU201217	Introduction to Statistical Methods	-	4.53
KU201218	Algorithm and Programming	-	4.53
TK201403	Material Balance	-	4.53
TK201404	Physical Chemistry	-	4.53
		Semester Workload	27.2

3rd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201103	Religion	-	3.02
TK201405	Chemical Engineering Thermodynamics	TK201404	4.53
TK201406	Energy Balance	TK201403 & TK201404	4.53
TK201407	Chemical Engineering Mathematics	KU201210	4.53
TK201408	Fluid Mechanics	KU201211	6.04
TK201409	Solid Operation	-	3.02

3rd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TK201410	Construction Materials	-	3.02
		Semester Workload	28.7

4th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201102	Indonesian	-	3.02
TK201411	Phase Equilibria	TK201405	4.53
TK201412	Applied Mathematics in Chemical Engineering	TK201407	4.53
TK201413	Heat Transfer Operation	TK201406	4.53
TK201414	Homogeneous Chemical Reaction Engineering	-	4.53
TK201415	Organic Chemistry	-	4.53
TK201416	Analytical Method and Instrumentation	TK201402	4.53
		Semester Workload	30.2

5th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201320	Resource Utilization	-	3.02
TK201417	Applied Numerical Method	TK201412	4.53
TK201418	Stagewise Separation Operation	TK201411	6.04
TK201419	Heat Exchanger Design	TK201413	3.02
TK201420	Heterogeneous Chemical Reaction Engineering	-	4.53
TK201421	Chemical Plant Utility	-	6.04
TK201422	Process Safety	-	4.53
		Semester Workload	31.7

6th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201108	Citizenship	-	3.02
KU2011321	Field Study Service	-	3.02
TK201423	Process Control	TK201412	4.53

6th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TK201424	Transport Phenomena	TK201412	6.04
TK201425	Process Design	TK201418	4.53
TK201426	Bioprocess	-	4.53
TK2015yy	Elective I	-	3.02
		Semester Workload	28.71

7th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TK201627	Practical Work	-	3.02
TK201428	Research	KU201102	12.09
TK201429	Chemical Plant Design	TK201425	4.53
TK201430	Process Vessel Design	-	3.02
TK2015yy	Elective II	-	3.02
TK2015yy	Elective III	-	3.02
		Semester Workload	28.7

8th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
TK201731	Final Project	TK201429 (ever take)	9.07
TK201432	Engineering Economics	-	3.02
TK201433	Production and Operation Management	-	3.02
TK2015yy	Elective IV	-	3.02
TK2015yy	Elective V	-	3.02
		Semester Workload	21.2

Elective Courses			
Course Code	Course Name	Pre-Requisite	ECTS
TK201501	Conservation of Energy	-	3.02
TK201502	Clean Technology	-	3.02
TK201503	Industrial Waste Valorization	-	3.02
TK201504	Membrane Technology	-	3.02
TK201505	Polymer Technology	-	3.02
TK201506	Catalyst Technology	Heterogeneous Chemical Reaction Engineering	3.02
TK201507	Particle Technology	-	3.02
TK201508	Nanomaterial and Nanotechnology	Analytical Method and Instrumentation	3.02
TK201509	Tissue Engineering	Organic Chemistry	3.02
TK201510	Palm Oil ProcessingTechnology	-	3.02
TK201511	Oil and Natural Gas Processing Technology	-	3.02
TK201513	Natural Gas Liquefaction Technology	-	3.02
TK201514	Food Processing Technology	-	3.02
TK201515	Marine Product Processing Technology	-	3.02
TK201516	Mineral Processing Technology	-	3.02
TK201517	Coal Conversion Processes	-	3.02
TK201518	Fertilizer Production Technology	-	3.02
TK201519	Cement Production Technology	-	3.02
TK201520	Oleochemical Production Technology	-	3.02
TK201521	Food Packaging and Preservation Technology	-	3.02
TK201522	Natural Products Extraction Technology	-	3.02
TK201523	Flavor Technology	-	3.02
TK201524	Fragrance Technology	-	3.02
TK201525	Drug and Cosmetic Technology	-	3.02
TK201526	Biorefinery	-	3.02
TK201527	Bioactive Natural Products	-	3.02
TK201528	Food Biochemistry	-	3.02
TK201529	Surface and Interface Phenomena	-	3.02
TK201530	Biochemical Reactor	-	3.02
TK201531	Process Intensification	-	3.02

TK201532	Chemical Engineering Process Simulation	-	3.02
TK201533	Chemical Product Design	-	3.02
TK201534	Electrochemical Technology	-	3.02
TK201535	Chemical Industry Business Development	-	3.02
TK201536	Chemical Process Project Management	-	3.02
TK201537	Selected Topic	-	3.02
TK201538	Internship A	-	6.04
TK201539	Internship B	-	12.09
TK201540	Internship C	-	18.13
TK201541	Internship D	-	24.18
TK201542	Internship E	-	30.22
TK201543	Internship F	-	36.27

According to appendix to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the bachelor degree programme Material and Metallurgical Engineering:

Program Educational Objectives

1	Pursue careers as successful professionals in materials and metallurgical engineering and related fields obeying to the professional code of ethics
2	Pursue lifelong learning opportunities to improve and expand their technical and professional skills.

Indented Learning Outcomes

1	An ability to communicate effectively in oral and written manners with a range of audiences;
2	An ability to solve complex problems, and make informed judgments, which must consider the sustainability aspect as well as to utilize information technology and the potential of national resources with a global perspective;
3	an ability to collaborate effectively in multidisciplinary and multicultural team whose members together provide leadership to achieve the objectives;
4	an ability to apply Pancasila values, ethical and professional responsibilities;

5	an ability to perform life-long learning and apply new knowledge as needed using appropriate learning strategies;
6	The ability to apply basic sciences and engineering principles to materials systems;
7	The ability to apply knowledge in material processes, structures, properties, and performance using experiment, computation, and statistical methods to solve problems; and
8	The ability to identify, analyze, and prevent material failure.

The following **curriculum** is presented:

1st Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201101	Pancasila		3,0
KU201217	Introduction to Statistical Methods		4,5
KU201211	Fundamental of Physics 1		4,5
KU201215	Fundamental of Chemistry		4,5
KU201209	Calculus 1		4,5
MM201411	Introduction to Materials and Metallurgical Engineering		3,0
MM201412	Engineering Drawing		4,5
		Semester Workload	28,5

2nd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201218	Algorithm and Programming		4,5
KU201212	Fundamental of Physics 2		4,5
KU201210	Calculus 2		4,5
KU201219	English		3,0
MM201421	Crystalline Solids Structure	MM201411	4,5
MM201422	Engineering Mechanics		4,5
		Semester Workload	25,5

3rd Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU2011XX	Religion*		3,0
MM201431	Polymer Chemistry	MM201411	3,0
MM201432	Engineering Mathematics for Materials Engineering		4,5
MM201433	Mechanics of Materials		4,5
MM201434	Metallic Materials	MM201421	4,5
MM201435	Thermodynamics of Materials		4,5
MM201436	Phase Transformation		4,5
		Semester Workload	28,5

4th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201102	Indonesian		3,0
MM201441	Transport Phenomenon		6,0
MM201442	Analytical Chemistry		4,5
MM201443	Glass and Ceramic Materials	MM201421	4,5
MM201444	Polymer Materials	MM201431	4,5
MM201445	Electromagnetic Behavior of Materials		3,0
MM201446	Mechanical Behavior of Materials		4,5
		Semester Workload	30

5th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201320	Resource Utilization		3,0
MM201451	Electrochemistry		4,5
MM201452	Characterization of Material		4,5
MM201453	Composite Materials	MM201444	4,5
MM201454	Metallic Processing	MM201434	6,0
MM201455	Polymer Materials Processing	MM201444	4,5
		Semester Workload	27

6th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
KU201321	Field Study Service		3,0
KU201108	Citizenship		3,0
MM201461	Numerical Analysis for Materials Engineering		4,5
MM201462	Corrosion and Corrosion Prevention		4,5
MM201463	Fracture Mechanics and Fractography		4,5
MM201464	Inspection Methods of Material		4,5
MM201465	Technology of Ceramic Processing	MM201443	4,5
		Semester Workload	28,5

7th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
MM201670	Practical Work		3,0
MM2015XX	Elective Course 1		3,0
MM2015XX	Elective Course 2		3,0
MM201471	Computation in Material Engineering		4,5
MM201472	Manufacturing Processes of Composite	MM201453	4,5
MM201473	Material Design	MM201453 MM201454 MM201455 MM201465	4,5
MM201474	Study of Material Failure	MM201462 MM201463	4,5
		Semester Workload	27

8th Semester			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
MM2015XX	Elective Course 3		3,0
MM2015XX	Elective Course 4		3,0
MM2015XX	Elective Course 5		3,0
MM2015XX	Elective Course 6		3,0
MM201780	Undergraduate Thesis		9,1
		Semester Workload	21,1

Elective Courses			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
MM201501	Internship A		6,0
MM201502	Internship B		12,1
MM201503	Internship C		18,1
MM201504	Internship D		24,2
MM201505	Internship E		30,2
MM201506	Internship F		36,3
MM201507	Capita Selecta		3,0
MM201508	Polymers Degradation		4,5
MM201509	Advanced Phase Diagram	MM201436	6,0

Elective Courses			
Course Code	**Course Name**	**Pre-Requisite**	**ECTS**
MM201510	Corrosion Inhibitor		7,6
MM201511	Production Management		9,1
MM201512	Additive Manufacturing		10,6
MM201513	Porous Materials		12,1
MM201514	Biomaterials		13,6
MM201515	Cryogenic Materials		15,1
MM201516	Electronic Materials		16,6
MM201517	Rubber-Based Materials		18,1
MM201518	Advanced Ceramic Materials	MM201443	19,6
MM201519	Magnetic Materials		21,2
MM201520	Optic Materials		22,7
MM201521	Refractory Materials		24,2
MM201522	Materials for Maritime		25,7
MM201523	Powder Metallurgy		27,2
MM201524	Finite Element Method		28,7
MM201525	Mineralogy		30,2
MM201526	Nanomaterials		31,7
MM201527	Superalloys		33,2
MM201528	Iron and Steel Making		34,8
MM201529	Heat Treatment		36,3
MM201530	Natural Polymers		37,8
MM201531	Metal Forming Process		39,3
MM201532	Technopreneurship		40,8
MM201533	Coating Technology		42,3
MM201534	Casting Technology		43,8
MM201535	Welding Technology		45,3
MM201536	Fiber Technology		46,8