



ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Electronics and Instrumentation

Master's Degree Programme
Computer Science

Provided by
Universitas Gadjah Mada

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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
"Program Studi S1 Elektronika dan Instrumentasi"	B.Sc. Electronics and Instrumentation	ASIIN	Reaccredited by BAN PT 2018-2023	02, 04
"Program Studi Magister Ilmu Komputer"	M.Sc. Computer Science	ASIIN	Accredited by BAN PT 2011-2021	04
<p>Date of the contract: 28.08.2018</p> <p>Submission of the final version of the self-assessment report: 16.11.2018</p> <p>Date of the onsite visit: 17.-18.12.2018</p> <p>at: Yogyakarta</p>				
<p>Peer panel:</p> <p>Prof. Bettina Harriehausen-Mühlauer, University of Applied Sciences Darmstadt;</p> <p>Prof. Bernd Becker, University of Freiburg;</p> <p>Prof. Reinhard Möller, University Wuppertal;</p> <p>Gregorius Ivan Sebastian, Brawijaya University</p>				
<p>Representative of the ASIIN headquarter: Dr. Martin Foerster</p>				
<p>Responsible decision-making committee: Accreditation Commission for Degree Programmes</p>				

¹ ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes; Euro-Inf®: Label European Label for Informatics; Eurobachelor®/Euromaster® Label: European Chemistry Label

² TC: Technical Committee for the following subject areas: TC 02 – Electrical Engineering/Information Technology); TC 04 – Informatics/Computer Science).

Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 10.03.2015 Subject-Specific Criteria of Technical Committee 04 - Infomatics as of 09.04.2018	
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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
Electronics and Instrumentation	B.Sc.		6	Full time		8 Semester	233 ECTS/144 sks	Once a year
Computer Science	M.Sc.		7	Full time		4 Semester	80 ECTS/44 sks	Every August

For the Bachelor's degree programme Electronics and Instrumentation the institution has presented the following profile in the self-assessment report:

„ The vision of the UP-EI is to be a leading and excellent program nationally in performing education, research, and community services especially in the field of electronics and instrumentation. In order to achieve the vision, the UP-EI has formulated and decided to (1) improve the quality of academic staff, students, and graduates in fundamental research and its applications that support the development of electronics and instrumentation as well as information technology for nation and human being prosperity, and (2) consistently commit the "Tri Dharma Perguruan Tinggi" (i.e., education, research, and community services). “

For the Master's degree programme Computer Science the institution has presented the following profile in the self-assessment report:

„In line with the vision of Universitas Gadjah Mada, MP-CS establishes a vision, at the end of 2050, to become the pioneer in the country and excel internationally, especially in the Computational Intelligence and Data Science. In order to achieve its vision, the MP-CS has a mission to (i) Developing and improving the implementation of Master program of Computer Science with International-grade students that master computer science, especially

³ EQF = The European Qualifications Framework for lifelong learning

B Characteristics of the Degree Programmes

in Computational Intelligent and Data Science, for national and human being prosperity; (ii) Conducting both theoretical and applied research activities, as well as scientific publications in an integrated and collaborative manner with international standards for lecturers and students. Consulting scientific activities at national and international level, as well as community service; (iii) Conducting national and international academic activities and Community Services; (iv) Providing infrastructure for teaching and learning process, research and dissemination“

C Peer Report for the ASIIN Seal⁴

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
- On-Site Discussions

Preliminary assessment and analysis of the peers:

For the Bachelor degree programme Electronics and Instrumentation (EI) and Master degree programme Computer Science (SC) the HEI presented a detailed description of general learning outcomes in the self-assessment report (SAR). The peers approve that a presentation of learning outcomes is given in the SAR in combination with a learning outcome matrix matching the described learning outcomes with the respective modules of the programmes.

Therefore, it became clearly visible to the review team that both degree programmes intend to convey academic knowledge and skills for a heavily requested job market as well as for the further pursuing of academic research. A strong focus is laid on ethical questions that are increasingly important for graduates of the respective fields. The peers appreciate that the graduates will thus be made aware of risks, challenges and limitations of their subject.

In the Bachelor programme EI it was further pointed out along seven defined learning outcomes that graduates shall be committed to the values of the country and local society, have fundamental, theoretical knowledge in the field of their studies but also generally in mathematics, physics, electronics and computer systems. The students are supposed to be capable of applying their knowledge by using subject-specific methods and tools, thereby

⁴ This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

solving basic problems in electronics and instrumentations as well as researching alone and in teams on questions using up-to-date scientific literature. This will allow them to work in a professional career in the field or continue the studies in a Master programme after successfully completing the Bachelor degree.

On the level of the Master in Computer Science a strong ethical and social awareness is similarly requested from all graduates. Based on the fundamental knowledge in informatics and natural sciences the students shall be further made acquainted with the basic concepts, methods, models and algorithms, as well as tools to develop intelligent systems and perform analysis and visualization of data communication. They should master theoretical and applied concepts in computer science, intelligent systems and data science, as well as be able to present these in a structured and systematic form. Graduates can analyse and solve complex problems in the field of computer science also being aware of alternative, interdisciplinary approaches. They can design and implement intelligent systems for various applications, provide optimal solutions, research on problems individually as well as in teams and will be able to present their research results to an interested audience on national as well as international level. Furthermore, they possess good interpersonal skills, are able to lead working teams, communicate professionally with stakeholders of diverse backgrounds and can therefore find employment in the broad field of Computer Science as well as continue their studies on a higher academic level in the form of a PhD programme.

In conclusion, the peers agree that the programmes' learning outcome adequately reflect international standards in the respective fields and comply with the ASIIN Subject-Specific Criteria as well as the EQF-level 6 for Bachelor and 7 for Master programmes.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report

Preliminary assessment and analysis of the peers:

The panel considered the names of the study programmes to be adequately reflecting the respective aims, learning outcomes and curricula.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Appendix 1 EI: Curriculum Guide
- Appendix 2 EI: Module Handbook
- Appendix 1.1 CS: Curriculum Guide 2017 Book
- Appendix 2.1 CS: Module Handbook
- On-Site Discussions

Preliminary assessment and analysis of the peers:

The curricula of both programmes under consideration were reviewed by the panel in order to evaluate whether the described learning objectives can be achieved by the available modules. Course descriptions as well as a matrix matching the general learning objectives and the module contents were also presented for a detailed analysis. The peers understood that every programme at Gadjah Mada University undertakes a regular curricular review process under consideration of the students' feedback. In the case of the two programmes under review it was explained that the recent curricular developments were being introduced after surveys and discussions also with alumni and local industry partners. For example, the special focus of the Computer Science Master in Artificial Intelligence was defined because of the feedback received from the stakeholders.

The Bachelor programme EI was lastly updated in 2016 and is divided into eight semesters. During the first year students get acquainted with the basics of the study field as well as natural sciences in general (Basic Physics and Chemistry, Programming, Introduction to Electronics and Instrumentation). Further, they attend classes on general skills and English language. During the second and third year these fundamentals are deepened and specialized through a variety of theoretical as well as laboratory courses. During the sixth semester a seminar provides students with a more thorough competence in critical thinking, presentation and discussion of research projects while the course Undergraduate Thesis Proposal is a first preparatory step towards the final research project. A mandatory industrial work practice provides in addition sufficient practical experience with a focus on future job opportunities. In the final year the thesis is being completed and a strong focus on ethical aspects is laid through courses as well as the compulsory Community Service Programme in the final semester. Throughout the curriculum starting from the second semester elective courses are included that allow for a certain individual specialization of the students. While the peers considered this to be laudable in general they also understood from the discussion with industry representatives as well as students, that these electives are purely subject specific and restrained to courses offered by the faculty of Mathematics and Natural Sciences. However, the industry remarked that graduates, although highly qualified in

the field, could possess more soft skills when it comes to presentation, communication and project management. It was outlined that professionals in the field today need not only to be subject-specific experts but need to be able to communicate with clients without any Informatics background. It was pointed out that such skills could be conveyed to the students in the context of elective courses from other faculties, a remark that was matched by the students' wish for more language courses apart from the mandatory English classes. Thus, the peers agreed that the electives could be opened up for other faculties as well and/or that the outlined soft skills should be strengthened within the already existing curriculum. Apart from this aspect, the peers approved of the curriculum as meeting international standards and requirements as well as being structured in a way as to achieve the intended learning outcomes.

The curriculum of the Master CS was presented in its current form of 2017 and allows for a high grade of flexibility for the students. In total 44 credits have to be gained, 23 out of them being attached to seven mandatory courses (Algorithm Analysis, Artificial Intelligent, Research Methodology, Software Engineering, Database Management System, Thesis Proposal and the Thesis). The remaining 21 credits can be obtained from a list of currently 32 electives. For the Master programme the same remarks with a view to the opening of electives are true as already made for the Bachelor programme. From the list of modules it became clear to the peers that the programme sets a strong focus on the topics Artificial Intelligence and Data Management. It was discussed with the stakeholders in how far this was being based on actual request from industry. The peers noted that the programme coordinators had made a thorough analysis of current industry demand before taking this direction. Continuous assessment of the demand is carried out and the curriculum is regularly updated if necessary. In any case, the discussion with the students revealed that the named focus is communicated well to those interested in the programme despite the general name of Computer Science; many of the students confirmed that they chose to study the programme especially because of the AI focus.

In conclusion, the peers agreed that the curricula are up to date and adequate in order to reach the described learning outcomes of the programmes.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Report
- Academic Guidance Book

- Decree of Minister of Education No. 126, 2016
- On site discussions

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Report the admission procedures and policies for new students follow the National Regulation No.126. The requirements, schedule, registration venue, and selection test are announced on UGM's webpage and are thus accessible for all stakeholders.

There are three different venues by which students can get admitted to UGM. First of all, there is the national admission system which is based on academic performance at high school. 40 % of the students at UGM get admitted through this selection system. Secondly, a national selection test is held every year for university candidates. It is a nationwide written test and it accounts for 30 % of the admitted students at UGM. Finally, 30 % of the students are selected on the basis of a written test, specifically designed by UGM.

For the Master the acceptance decision lies with UGM and the primary criterion is based on the Bachelor grade. However, there are other criteria that can also be taken into account if the number of equally qualified applicants is higher than the number of places. If applicants from other programmes apply, this is generally possible but students have to retake some courses. These are offered in the form of a compact course during the holiday.

From their discussion with the students the peers gain the impression that the admission system is effective and mostly very motivated and high-performing candidates get admitted. The peers consider the dedicated students to be one of the strong points of both programmes.

In summary, the auditors find the terms of admission to be binding and transparent. They confirm that the admission requirements support the students in achieving the intended learning outcomes.

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

The peers consider the criterion to be completely fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules
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Evidence:

- Self-Assessment Report
- Appendix 1 EI: Curriculum Guide
- Appendix 2 EI: Module Handbook
- Appendix 1.1 CS: Curriculum Guide 2017 Book
- Appendix 2.1 CS: Module Handbook
- On-Site Discussions

Preliminary assessment and analysis of the peers:

All study programmes under review are divided into modules, which comprise a sum of teaching and learning. In general, the panel found the structure of the modules to be adequate and manageable. As was described above the curricula include theoretical classes as well as laboratory classes ensuring sufficient practical application of the theoretical content. The existence of a sufficient number of electives further ascertains that an individual specialization of the students can take place throughout the programmes while it has already been pointed out that the peers recommended broadening the spectrum of the electives in a certain way as to include more courses on languages and soft skills. The internship included in the seventh semester also guarantees that students of the Bachelor programme get into contact with industry and are well prepared for pursuing a professional career of completing their degree.

Discussion with all stakeholders but especially the University management revealed that Gadjah Mada University is currently facing the major challenge of internationalization. On university level a growing number of bilateral cooperation agreements have already been signed and well-working partnerships have been established in some of the faculties. However, the peers gained the impression that at the faculty of Mathematics and Natural Sciences and especially in the programmes under review the number of partnerships on an international level is still very limited. Currently co-operations are only in place with universities in Japan and Taiwan as well as with the University of Birmingham. While the peers appreciated that the programmes coordinators accept the challenge of internationalization and contribute to increase the number of partnerships, they would like to encourage them to further proceed in this direction. During the accreditation period the number of international partnerships agreements should grow accordingly. One clear limitation to the internationalization endeavours was detected by the peers not only on faculty but also on university level. According to the information presented in the documents and from what was

explained during the on-site visit it became apparent that no process for the recognition of credits gained at other (Indonesian or foreign) universities exists. While a number of dual degree programmes with international partners have been developed for which recognition of credits from the part university is ensured, the transfer of credits from one university to another is not possible in the regular programmes. As international mobility and credit recognition is a major issue in the current development of Higher Education globally the peers underlined its importance and pointed out that respective regulation should be established facilitating mobility for incoming as well as outgoing students.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- On-site discussions

Preliminary assessment and analysis of the peers:

As was outlined above, all modules are assigned with 1 to 3 credits while lab courses usually equal 1 credit the other courses 3 in some cases 2. Usually students are recommended to take 16 credits. If their performance is above average they are allowed to take up to 24 per semester, if it is below average they have to take less. Consequently, in it is well possible to finish the programme in less than eight semesters but extension of the standard period of study is also not uncommon. The workload assigned to one credit is defined by the ministry of education and is currently at 170 minutes of work per week. In theoretical courses these 170 minutes include 50 minutes of class lecture, 50 minutes of homework or exam preparation and 70 minutes of self-study. In lab courses the 170 minutes equal 100 minutes of class attendance and 70 minutes of self-study. This difference in calculation apparently leads to some misunderstanding from part of the students who remarked that the workload in the lab classes is usually higher than in the other courses. Following the explanation from the teaching staff, this is only based on the different forms of workload calculation. Hence, the peers did not see an overload of work in the labs but it might be helpful to communicate the calculation clearly to the students. Since the workload and number of credits for courses is defined by the government the university's options to adapt the workload to students' reality are limited. Nevertheless, the peers detected that no assessment of student workload is carried out at the moment at all. The peers emphasized that such an assessment should be implemented. An assessment of the workload would at least lay the foundation for a clear analysis of the real distribution of workload in the respective

courses and would allow to adapt the curriculum if necessary although the number of credits were not themselves modified.

Despite this point, the peers talked to all the stakeholders and came to the conclusion that the workload is distributed evenly throughout the semesters and that the students did not complain in any way about an overload.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Report
- On-site-discussions

Preliminary assessment and analysis of the peers:

It has already been outlined that teaching in both programmes includes theoretical foundations as well as practical work, which was welcomed by the peers. In general, teaching includes lectures, classroom exercises, tutorials, group exercises, laboratory work, as well as group work and individual projects. The discussion with the teaching staff showed a clear commitment of the teachers to the concept of Student Centred Learning (SCL). Several good examples of the innovative and practice-oriented teaching methodology could be provided, such as workshops within several courses where students can practically apply the theoretically learned contents or the active involvement of industry partners to integrate real-life problems into the theoretical teaching. Consequently, the peers were convinced that the applied teaching methodology was apt to support the students in achieving the defined learning outcomes.

Nevertheless, the peers realized a difficulty during the internship where there is no direct communication established between the employing company and the university supervisor. Although every student officially has a supervisor from the company as well as the faculty these two do not get into contact. Thus, it cannot be ensured that the students' work is actually in compliance with what he has learned during the previous courses and contributes to his further academic development. Consequently, the peers emphasized that such a direct communication between all parties should be established for the benefit of the student.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- On-site-discussions
- Students' Support website (accessed 11.01.2019): <https://ugm.ac.id/en/kemaha-siswaan>

Preliminary assessment and analysis of the peers:

The peers had an excellent impression of the offers related to support and assistance of the students at the faculty. The students confirmed that the teaching staff is always available to any questions and supports the students in every possible way. In addition, students have individual mentors that support them during the semester and coordinate the study plan. As was pointed out before the performance of the individual student indicates how many credits he is allowed to take in the following semester. All these aspects are being discussed with the mentor.

Apart from these academic support offers, students at UGM can make use of a variety of measures furthering their social and non-subject-specific development. On the students' support website information is provided about assistance in acquiring scholarships locally and abroad, the huge range of students' activities from an academic, cultural or sports background, as well as information about accommodation and transport in the city of Yogyakarta.

In summary, the peers gained the impression of a close relation between teaching staff and students creating a harmonious environment for teaching and learning.

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

Based on the comments of the HEI the peers appreciate that the faculty and the programmes under review are planning on further expanding their international co-operations, despite the fact the faculty already entertains partnerships with 5 Universities in Taiwan, China, Japan and the UK. They are further informed that a recognition process for credits gained at other Universities is in place; however, the University does not allow students coming from other Universities to enrol at UGM and to continue their studies at the point where they left. The peers insist that such a process needs to be established including

the recognition of credits based on the acknowledgement of competencies gained at other Universities.

Concerning the internship the peers are informed that the programme coordinators plan to assign lecturers supervising the students on site in the companies. In addition, during internships the supervisor will have regular online communication with the student. This initiative is very much appreciated by the peers.

In conclusion, the peers consider the criterion to be partly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Appendix 4 EI: Standard of Procedure of Thesis
- Appendix 3.1 CS: Standard of Procedures of Thesis
- On-site discussions

Preliminary assessment and analysis of the peers:

Each course-content in the reviewed study programmes is reflected in exams, which are distributed in a mid-term and a final examination period each semester. Information about the examination form and date is given at the latest at the beginning of the semester and the students feel well informed about exams and their regulations in general. From the discussions on site it became clear that exams are usually in a written form despite the fact that other examination forms would be theoretically possible. The teachers refer to the fact that many courses also include group or individual projects that have to be presented in front of the class during the semester. Although this was considered positive by the peers it was also discussed if the introduction of at least a few oral exams instead of written ones might be helpful to assess not only the students' knowledge but also his or her ability to spontaneously react to questions and to explain contexts in his own words. Especially with reference to the already discussed soft and communication skills of the students such an exam would contribute to further improvement.

The peers checked a variety of exams and theses and agreed that they generally represented an adequate level of knowledge as required by the EQF-Level 6 and 7 respectively. Especially the level of some of the Master theses which were written in English language

was considered of good quality and clearly documented the high quality standard of the programmes.

In conclusion, the peers saw that all relevant examination regulations are in place and well communicated in a transparent way. The forms of exams are oriented toward the envisaged learning outcomes of the respective courses and the workload is distributed in an acceptable way.

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

The peers consider the criterion to be largely fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Appendix 4.1 Joint Report: List of Supporting Staffs
- Appendix 5 IE: Staff Handbook
- Appendix 4.1 CS: Staff Handbook

Preliminary assessment and analysis of the peers:

During the discussions on site, the peers had active exchange with a variety of staff members from both programmes and had no doubt that their quantity and quality was absolutely adequate for the management of the programmes under review. In the Bachelor programme in 2017/18 a teacher-student-ratio of 1:3.5 and in the Master programme of 1:6 could be achieved. However, the university and the respective programmes in particular do face a challenge of a transition period as the amount of PhD-Holders among the teaching staff is limited. In the case of the faculty of Mathematics and Natural Sciences only about 50% of the teaching staff holds a PhD degree and only two full professors have been appointed. The peers understood from the announcement of the rector of the university that it is part of the strategy to increase the share of PhD-Holders in the teaching staff, and from the discussions on site the peers learned that staff members receive a lot of university and especially government support to write their PhD at renowned universities across the

world. These endeavours were very much appreciated and supported by the peers who emphasized that this path needs to be followed closely during the accreditation period. In combination with the target to increase the international visibility of the university and the programmes the further qualification of the staff members is an extremely important aspect. Furthermore, it was pointed out that an increase of internationalization and expertise in the programmes might be achieved by not only promoting step by step the internal staff members but also to think about attracting experts from other universities (national as well as international) who have already gained a highly visible international profile.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report
- On-site discussions

Preliminary assessment and analysis of the peers:

From the discussion with the teaching staff the peers learned that Gadjah Mada University has put a lot of emphasis during the past years on the professional training and development of its staff members. It was already pointed out above that a variety of support measures are in place to support young researchers in completing their PhD degrees at foreign universities. Similarly, the University offers a great number of incentives that can make up to the double of the usual salary rewarding teaching staff for publications outstanding evaluation results, or participation in didactical schooling.

The peers learned that there is also the possibility to take a sabbatical leave which would be funded by the national government. The only restriction in this case is the fact, that the full funding is only awarded to professors, not to the regular teaching staff. Since in the programmes under review out of 50 staff members there are only two full professors this reduces the opportunity to benefit from government funding significantly. Consequently, the peers recommended thinking about alternative support structures within the faculty or the university to have other staff members equally participate in the benefits of a sabbatical leave. In conclusion, the peers were convinced that the development offers for staff members are mostly adequate and contribute to a constant improvement of the learning and teaching environment.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Appendix 4.3 Joint Report: List of Faculty's Facilities
- On-site visit

Preliminary assessment and analysis of the peers:

During the on-site visit, the peers inspected the research and teaching facilities of the programmes and considered the available equipment to be largely of adequate standards. Teachers and students were quite content with the availability of the equipment and the library and the peers agreed that the facilities provide everything required for the successful implementation of the programme. The visitation of the laboratories also revealed that some of them offer only limited space for students and might be overcrowded if full student groups try to work in them. In the long term the peers suggested consequently, to consider the refurbishment of the smaller labs in order to create sufficient space for the number of students in the programmes.

A second aspect which the peers took note of was the not always adequate barrier-free access to the facilities of the university. According to the teaching staff in the older buildings barrier-free access is not always ensured, elevators are sometimes out of order if they have been installed at all, etc. The peers fully understood that this situation cannot be changed immediately and they approved of the fact that the programme coordinators were aware of the situation; thus, in future it should be made certain that the barrier-free access for all stakeholder with physical restrictions is ensured when buildings are constructed or renovated.

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

From the comments of the HEI the peers understand that the Sabbatical leave programme is indeed only eligible for professors. But, additionally, there is a similar programme called World Class Professor where regular teaching staff can also apply. Several examples of teaching staff participating in that programme were provided by the HEI. Consequently, the peers agree that this aspect is now fully covered.

Concerning the situation of the non-barrier-free buildings the HEI fully agrees with the assessment of the peers and explains that a new building is about to be constructed. As the

peers already noticed in their report, immediate change cannot be expected but they appreciate the awareness of the HEI.

In conclusion, the peers consider this criterion to be fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Appendix 2 EI: Module Handbook
- Appendix 2.1 CS: Module Handbook
- On-site discussions

Preliminary assessment and analysis of the peers:

The peers appreciated the module descriptions presented beforehand with the self-assessment report. For many subject-specific courses, descriptions were made available and are accessible to the students. These give full information about the courses, contents, learning outcomes and recommended literature. However, a number of descriptions were only accessible in Indonesian and could therefore not be assessed by the peers. In order to allow for a detailed analysis of the course contents the peers asked for the provision of fully translated module handbooks including all compulsory modules of the programmes. From the descriptions of the modules that were available in English a certain issue arose concerning the Master programme. While the inspection of exams and especially Master theses underlined that the quality level of the programme as well as the students is adequate in comparison with EQF Level 7 this did not become entirely visible from the module descriptions. There, the description of content and learning outcomes appeared to comprise merely basic knowledge and competencies not aligned to Master level. Since the peers were basically convinced of the quality standards of the programmes they considered this to be a descriptive deficiency and consequently demanded that the module descriptions apart from being in English language should also represent the adequate level of knowledge.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Appendix 6 EI: Diploma
- Appendix 7 EI: Transcript of Records
- Appendix 8 EI: Diploma Supplement
- Appendix 5.1 CS: Diploma
- Appendix 5.2 CS: Transcript of Records
- Appendix 5.3: Diploma Supplement

Preliminary assessment and analysis of the peers:

At graduation, all students are provided with a diploma and a Diploma Supplement in Indonesian and English language. The Diploma Supplement gives all required information about the degree programmes, the individual study performance, the selected courses, a relative grade of the student and an overview over the Indonesian system of higher education.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Report
- On-site discussions

Preliminary assessment and analysis of the peers:

From the documents provided and the discussions during the on-site visit, the peers learned that the GMU follows a policy of transparent and open rules and regulations. All required rules and regulations are made accessible to students at any time online. The discussion with the students confirmed that they felt well informed about regulations and comfortable about the access to any information about their degree programmes. Nonetheless, as was pointed out before, the university does not have any regulations in place for the recognition of credits awarded by other institutions. In order to comply with the ASIIN and ESG requirements such a procedure needs to be defined in near future.

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

The HEI has already reviewed its module descriptions and their presentation on the website and provided the peers with the respective links. Thus, the peers could now check all module descriptions. However, the revision of the Master modules in regard to the expected learning outcomes is still pending. As was pointed out before, the recognition of credits is regulated by the Universitas Gadjah Mada's Rector decree number 16/2016. Nevertheless, recognition of credits gained by students transferring from other universities need also to be established. Consequently, the peers consider the criterion to be partly fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Appendix 6.3 CS: Alumni Survey Questions

Preliminary assessment and analysis of the peers:

From the discussions with all stakeholders the peers gained the impression that at GMU a thorough quality management system has already been installed and is working well in order to ensure a constant development of the degree programmes including feedback from several stakeholder groups.

Every course is evaluated each semester by the students and assessed by a central audit committee. Evaluation results are included in an annual internal evaluation of each programme and regular national as well as international external evaluations and accreditation procedures are being pursued. However, the peers detected that the results of the course surveys are only centrally analysed by the named audit committee and any developments resulting from the analysis is henceforward included in the development plans of the programme or the faculty. Analysis results are communicated to the respective teacher and measures are taken if the evaluation results are below average. Nonetheless, feedback about the survey results are only presented by the teacher to the class of the following semester outlining what consequences will be drawn from the assessment. The students themselves do not receive any notification about the results of their survey and consequently the feedback circles are not closed entirely. During the discussion with the students

they expressed the general desire to receive more information about their feedback and that a discussion with survey results during the semester would be more than welcome. It was clearly stated that if there was no feedback about the survey students considered this to be a compulsory formality necessary to get to know their grades but not as an active contribution to the further development of the quality of teaching and learning. The peers fully agreed with this assessment and recommended to close the feedback loops accordingly.

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

The peers learn from the HEI's comments that they envisage to modify the EDOM system according to the peers' remarks. It is planned that the department will introduce regular meetings with the students to follow up the feedback from students. The peers appreciate these plans but maintain their assessment until further developments have been documented. In conclusion, the peers consider this criterion to be partly fulfilled.

D Additional Documents

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

Full English translation of module description of all compulsory modules.

E Comment of the Higher Education Institution (08.02.2019)

The institution provided a detailed statement in a separate document and provided links to the full English version of the module descriptions.

F Summary: Peer recommendations (20.02.2019)

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electronics and Instrumentation	With requirements for one year	-	30.09.2024
Ma Computer Science	With requirements for one year	-	30.09.2024

Requirements

- A 1. (ASIIN 5.3) A process for the recognition of credits awarded by other universities needs to be established.
- A 2. (ASIIN 2.2) A survey of the actual student workload has to be carried out.
- A 3. (ASIIN 5.1) Module descriptions of all compulsory modules need to be presented in English language. From the description and the course requirements of the compulsory Master courses it must be made clear that skills on Master level are actually being conveyed.
- A 4. (ASIIN 6) The feedback loops in the quality management process have to be closed insofar as an immediate feedback from the course surveys is provided to the students.

Recommendations

- E 1. (ASIIN 4.1) It is recommended to increase the percentage of teaching staff with a PhD according to the University strategy within the next years. It should be ensured, that every course is eventually supervised by at least a PhD holder.
- E 2. (ASIIN 2.1) It is recommended to open the students' access to electives from other faculties.
- E 3. (ASIIN 3) It is recommended to introduce oral examinations in order to improve the students' communication skills.
- E 4. (ASIIN 2.1) It is recommended to further develop international co-operations of the department.

- E 5. (ASIIN 2.3) It is strongly recommended to establish a communication between company and university supervisor during the internships.
- E 6. (ASIIN 4.2) It is recommended to make sabbatical funding available not only for professors but all academic staff.
- E 7. (ASIIN 4.3) It is recommended to improve the barrier-free access to the teaching facilities.
- E 8. (ASIIN 4.3) It is recommended to create more space for student workplaces in the laboratories.

G Comment of the Technical Committees

Technical Committee 04 – Informatics (19.03.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and agree with the assessment of the peers.

The TC 04 – Informatics recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electronics and Instrumentation	With requirements for one year	-	30.09.2024
Ma Computer Science	With requirements for one year	-	30.09.2024

Technical Committee 02 – Electrical Engineering (15.03.2019)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure.

In its view, the monitoring of the student workload is an ongoing task, which should be reflected in the respective requirement (see below requirement A 2).

In addition, the Technical Committee does not comprehend why the request for an English translation of the module descriptions should be restrained to the compulsory courses. It therefore suggests deleting this specification (see below requirement A 3.).

Furthermore, an extension of the sabbatical funding not only for professors but for the whole academic staff certainly could be considered a worthwhile asset, but in the opinion of the Technical Committee should not be followed in an accreditation – not even as a recommendation. In fact, this has hardly ever been an issue in German accreditations, although it would not be difficult to make a case for that throughout. Consequently, the Technical Committee proposes to delete this recommendation.

For the rest, the Technical Committee agrees with the recommended resolution of the peers.

The TC 02 – Electrical Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electronics and Instrumentation	With requirements for one year	-	30.09.2024
Ma Computer Science	With requirements for one year	-	30.09.2024

Requirements

- A 1. (ASIIN 2.1; 5.3) A process for the recognition of credits awarded by other universities needs to be established.
- A 2. (ASIIN 2.2) A survey of the actual student workload has to be carried out on a regular basis.
- A 3. (ASIIN 5.1) Module descriptions of all ~~compulsory~~ modules need to be presented in English language. From the description and the course requirements of the compulsory Master courses it must be made clear that skills on Master level are actually being conveyed.
- A 4. (ASIIN 6) The feedback loops in the quality management process have to be closed insofar as an immediate feedback from the course surveys is provided to the students.

Recommendations

- E 1. (ASIIN 4.1) It is recommended to increase the percentage of teaching staff with a PhD according to the University strategy within the next years. It should be ensured, that every course is eventually supervised by at least a PhD holder.
- E 2. (ASIIN 2.1) It is recommended to open the students' access to electives from other faculties.
- E 3. (ASIIN 3) It is recommended to introduce oral examinations in order to improve the students' communication skills.
- E 4. (ASIIN 2.1) It is recommended to further develop international co-operations of the department.

G Comment of the Technical Committees

- E 5. (ASIIN 2.3) It is strongly recommended to establish a communication between company and university supervisor during the internships.
- ~~E 6. (ASIIN 4.2) It is recommended to make sabbatical funding available not only for professors but all academic staff.~~
- E 7. (ASIIN 4.3) It is recommended to improve the barrier-free access to the teaching facilities.
- E 8. (ASIIN 4.3) It is recommended to create more space for student workplaces in the laboratories.

H Decision of the Accreditation Commission (29.03.2019)

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

The Committee discusses the procedure and agrees with the assessment of the peers but not with the proposition of Technical Committee 02 to delete recommendation 6. The importance to create space for research among the teaching staff is emphasized by the committee members.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Electronics and Instrumentation	With requirements for one year	-	30.09.2024
Ma Computer Science	With requirements for one year	-	30.09.2024

Requirements

- A 1. (ASIIN 2.1; 5.3) A process for the recognition of credits awarded by other universities needs to be established.
- A 2. (ASIIN 2.2) A survey of the actual student workload has to be carried out on a regular basis.
- A 3. (ASIIN 5.1) Module descriptions of all modules need to be presented in English language. From the description and the course requirements of the compulsory Master courses it must be made clear that skills on Master level are actually being conveyed.
- A 4. (ASIIN 6) The feedback loops in the quality management process have to be closed insofar as an immediate feedback from the course surveys is provided to the students.

Recommendations

- E 1. (ASIIN 4.1) It is recommended to increase the percentage of teaching staff with a PhD according to the University strategy within the next years. It should be ensured, that every course is eventually supervised by at least a PhD holder.

- E 2. (ASIIN 2.1) It is recommended to open the students' access to electives from other faculties.
- E 3. (ASIIN 3) It is recommended to introduce oral examinations in order to improve the students' communication skills.
- E 4. (ASIIN 2.1) It is recommended to further develop international co-operations of the department.
- E 5. (ASIIN 2.3) It is strongly recommended to establish a communication between company and university supervisor during the internships.
- E 6. (ASIIN 4.2) It is recommended to make sabbatical funding available not only for professors but all academic staff.
- E 7. (ASIIN 4.3) It is recommended to improve the barrier-free access to the teaching facilities.
- E 8. (ASIIN 4.3) It is recommended to create more space for student workplaces in the laboratories.

I Fulfilment of Requirements (20.03.2020)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Electronics and Instrumentation	All requirements fulfilled		30.09.2024
Ma Computer Science	All requirements fulfilled		30.09.2024

Appendix: Programme Learning Outcomes and Curricula

According to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Electronics and Instrumentation:

To achieve those alumni profiles, the UP-EI determined the program learning outcomes (PLOs) as depicted in Table 1.1.

Table 1.1 Program Learning Outcome of UP-Electronics and Instrumentation Program

PLO	Knowledge Area	PLO Description
PLO1	[Values and principles]	uphold the practice of the five principles of Pancasila and law enforcement, as well as committing to respect the diversity of religion, ethnicity, culture, language, and art that grow and develop in Indonesia or other countries.
PLO2	[Foundational and theoretical knowledge]	master foundational and theoretical knowledge in the field of electronics and instrumentation, particularly in the topics of mathematics, physics, electronics, computer systems, intelligent systems, robotics, instrumentation, and automation.
PLO3	[Applied knowledge]	capable of using various methods and tools, which include modeling, design, development, verification, and validation of electronics and/or instrumentation systems, to develop concepts in solving various problems in the field of electronics and instrumentation.
PLO4	[Problem-solving skills]	capable of applying foundational, theoretical, and applied knowledge in the field of electronics and instrumentation and adapting that knowledge together with the state-of-the-art science and technology in developing solutions.
PLO5	[Ability to do research]	have the ability to perform literature study related to electronics and instrumentation as well as to conduct research, individually or in a team, related to electronics and instrumentation.
PLO6	[Professional attitudes]	have strong leadership, proficient in organizing work-related knowledge and information, be able to demonstrate good work ethics in teamwork and individual work, be able to demonstrate good oral and written communication skills both in Bahasa Indonesia and English.

PLO	Knowledge Area	PLO Description
PLO7	[Life-long learning]	Have the skills to deepen the knowledge gained previously, especially in the field of electronics and instrumentation, regarding life-long learning.

The following **curriculum** is presented:

Table 1.5 List of compulsory modules in UP-EI

No.	Semester	Module Name	B/I/S	Credit	ECTS
1	I	Pancasila	B	2	2.5
2		Basic Physics I	B	3	3.5
3		Basic Chemistry I	B	3	3.5
4		Calculus I	B	3	3.5
5		Programming I	B	3	3.5
6		Programming Lab I	B	1	1.2
7		Electric Circuit	B	2	2.5
8		Religion	B	2	2.5
9		Introduction to Electronics and Instrumentation	B	2	2.5
10	II	English	B	3	3.5
11		Bahasa Indonesia	B	2	2.5
12		Basic Physics II	B	3	3.5
13		Calculus II	B	3	3.5
14		Digital Electronics	B	3	3.5
15		Digital Electronics Lab	B	1	1.2
16		Electronics and Instrumentation Workshop	B	1	1.2
17		Measurement Methods	B	2	2.5
18		Introduction to Instrumentation	B	3	3.5
19	III	Analysis of Physical Measurement	I	2	2.5
20		Electronic Mathematics I	I	3	3.5
21		Analog Electronics	I	3	3.5
22		Analog Electronics Lab	B	1	1.2
23		Microprocessor	B	2	2.5

No.	Semester	Module Name	B/I/S	Credit	ECTS
24		Microprocessor Lab	B	1	1.2
25		Actuator Systems	I	3	3.5
26		Actuator Systems Lab	I	1	1.2
27		Citizenship	B	2	2.5
28	IV	Electronic Mathematics II	I	3	3.5
29		Advanced Electronics	I	3	3.5
30		Advanced Electronics Lab	I	1	1.2
31		Introduction to Control Systems	S	3	3.5
32		Computer Network	S	3	3.5
33		Computer System Interface	B	2	2.5
34		Computer System Interface Lab	B	1	1.2
35		V	Intelligent Instrumentation	S	3
36	Sensors and Transducers		S	3	3.5
37	Digital Signal Processing I		S	3	3.5
38	Digital Signal Processing I Lab		S	1	1.2
39	Control Systems		S	3	3.5
40	Control Systems Lab		S	1	1.2
41	Research Methodology		I	2	2.5
42	VI	Seminar	I	1	1.2
43		Industrial Practice Work	I	3	3.5
44		Special Assignment I	I	1	1.2
45		Undergraduate Thesis Proposal	I	2	2.5
46		Digital Control	S	3	3.5
47		Digital Control Lab	S	1	1.2
48	VII	Entrepreneurship and Professional Ethics	B	2	2.5
49		Special Assignment II	I	1	1.2
50		Undergraduate Thesis	S	6	7.5
51	VIII	Community Service Program	I	3	3.5

Note: B: Basic, I: Intermediate, S: Specialized

Table 1.6 List of elective modules in UP-EI

No.	Semester	Module Name	B/I/S
1	II	Programming II	B
2		Programming II Lab	B
3		Microcontroller	I
4		Microcontroller Lab	I
5		Introduction to Biosystems	S
6	III	Industrial Instrumentation	S
7		Industrial Instrumentation Lab	S
8		Computer Organization and Architecture	I

No.	Semester	Module Name	B/I/S
9		Computer Organization and Architecture Lab	I
10		Programmable Logic Controller	S
11		Programmable Logic Controller Lab	S
12	IV	Electronic Simulation Workshop	S
13		Industrial Otomation	S
14		SCADA and DCS	S
15		Artificial Intelligence	S
16		Computer Network Lab	S
17		Network and Mobile Device Programming	S
18	V	Embedded Systems	S
19		Embedded Systems Lab	S
20		Image Processing	S
21		Embedded Systems OS	S
22		Intelligent Instrumentation Lab	S
23		Parallel Systems	S
24	VI	Robotics	S
25		Robotics Lab	S
26		Digital Signal Processing II	S
27		Computer Vision	S
28		Sensor Networks	S
29		Pattern Recognition	S

Note: B: Basic, I: Intermediate, S: Specialized

According to the self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Computer Science:

Table 1.1 Program Learning Outcome of MP-CS

I. Attitude and Values	
PLO1	Attitudes and values
	Having the following attitudes and values: (a) Be taqwa to God Almighty. (b) Have good morals, ethics and personality in completing the task. (c) Serve as a citizen who proud and love Indonesia and support world peace. (d) Be able to work together and have high social sensitivity and concern for the society and the environment. (e) Respect for cultural diversity, beliefs, and religions as well as the original opinions/ findings of others. (f) Uphold the law enforcement and have a passion to put the interests of the nation and the wider community.
II. Knowledge	
PLO2	Foundational knowledge
	Mastering the foundation of knowledge in the form of concepts, methods, models and algorithms, as well as tools to: (a) develop intelligent systems that have reasoning capabilities as an expert. (b) perform analysis, visualization and data communications.
PLO3	Theoretical knowledge
	Having knowledge and understanding of computer science, which includes abstraction, complexity and evolution of the change or development of the field of science.
PLO4	Applied knowledge
	Mastering theoretical and applied concepts in computer science, intelligent systems and data science, as well as representing it in a structured and systematic form.
III. Working Capabilities	
PLO5	Problem-solving skills
	Be able to analyze science and technology problems in the field of computer science, choose alternative settlement through interdisciplinary approach, so that it produces innovative and tested works; Mastering in designing and implementing intelligent

	systems for various applications; Mastering in developing an inspired system of biological behavior (bio-inspired) that can be utilized to provide optimal solutions / solutions to problems encountered.
PLO6	Ability to do research
	Be able to formulate research problems through critical and explorative studies either independently or in groups in the field of computer science, as well as presenting in a scientific work at national or international level; Be able to analyze and communicate data; Be able to formulate data requirements from a business problem, design solutions and identify algorithms, technologies and tools for completion.
IV. Managerial Capabilities	
PLO7	Professional attitudes
	Having good interpersonal skills; Be able to work together in teams, both as leaders and members; and be able to share and delegate tasks; as well as having a sense of responsibility on the job itself and can be given responsibility for the achievement of teamwork.
PLO8	Communication skills
	Be able to communicate effectively with stakeholders from diverse backgrounds and using English; and able to write and present the scientific / ideas / insights correctly and well.
PLO9	Life-long learning
	Having the skills to keep up with state-of-the-art developments in computer science, in particular, and to deepen and develop knowledge.

The following **curriculum** is presented:

Table 5. Compulsory Courses in MP-CS

No	Code	Course Name	Credits	Semester	Prerequisite	Type ¹
1	MII5011	Algorithm Analysis	3	1 st	-	Compulsary
2	MII5051	Artificial Intelligent	3	1 st	-	Compulsary
3	MII6001	Research Methodology	3	1 st	-	Compulsary
4	MII5031	Software Engineering	3	1 st	-	
5	MII6033	Database Management System	3	1 st	-	
Credit SubTotal			15			
1	MII6002	Proposal Thesis	2	1 st	MII6009	Compulsary
2	MII6011	Tesis	6	2 nd	MII6002*	Compulsary
Credit SubTotal			8			
CREDIT TOTAL			23			

Table 6. Electic Courses in MP-CS

No	Code	Course Name	Credits	Semester	Research Groups	Prerequisite	Type ¹⁾
1	MII6214	Applied Algebra and Statistic	3	Even	Komp	-	MKL
2	MII6838	Big Data Analysis	3	Even	RPLD	-	MKP
3	MII6632	Data Science	3	Even	RPLD	MII6634*	MKL
4	MII6292	Electronics	3	Even	Elins	-	MKL
5	MII6294	Instrumentations	3	Even	Elins	-	MKL
6	MII6836	Software Quality Assurance	3	Even	RPLD	MII5031	MKP
7	MII6272	Computer Network	3	Even	SKJ	-	MKL
8	MII6874	Network Security	3	Even	SKJ	MII6272*	MKP
9	MII6452	Computational Intelligence and Machine Learning	3	Even	SC	MII5051	MKL
10	MII6818	Parallel Computation	3	Even	Komp	MII5011	MKP
11	MII6816	Cryptography	3	Even	Komp	-	MKP
12	MII6454	Fuzzy Logic	3	Even	SC	MII5051	MKL
13	MII6634	Mathematics for Data Science	3	Even	RPLD	-	MKL
14	MII6212	Automata and Language Theory and Applications	3	Even	Komp	-	MKL
15	MII6896	Digital Signal Processing	3	Even	Elins	MII6292 dan MII6294	MKP
16	MII6856	Expert System	3	Even	SC	MII5051	MKP
17	MII6858	Decision Support Systems	3	Even	SC	-	MKP
18	MII6876	Embedded Systems	3	Even	SKJ	-	MKP
19	MII6453	Computer Logic	3	Odd	SC	MII5051	MKL
20	MII6835	Semantic Search and Information Retrieval	3	Odd	RPLD	MII5051*	MKP
21	MII6455	Pattern Recognition	3	Odd	SC	-	MKL
22	MII6895	Digital Image Processing	3	Odd	Elins	MII6455*	MKP
23	MII6213	Operations Research	3	Odd	Komp	-	MKL
24	MII6893	Robotics	3	Odd	Elins	-	MKP
25	MII6815	Computational Sciences	3	Odd	Komp	MII5011	MKP
26	MII6291	Control Systems	3	Odd	Elins	MII6294*	MKL

No	Code	Course Name	Credits	Semester	Research Groups	Prerequisite	Type ¹⁾
27	MII6875	Wireless Communication and Mobile Systems	3	Odd	SKJ	MII6272*	MKP
28	MII6671	Distributed and Cloud Systems	3	Odd	SKJ	MII6272*	MKL
29	MII6857	Bio-Inspired System	3	Odd	SC	MII5051	MKP
30	MII6873	Social Informatics	3	Odd	RPLD	-	MKP
31	MII6837	Bussiness Problem and Data Science Solution	3	Odd	RPLD	-	MKP
32	MII6817	Verification and Validations	3	Odd	Komp	-	MKP