



ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes

Informatics

Information Systems

Master's Degree Programmes

Informatics

Information Systems

Provided by

Institut Teknologi Sepuluh Nopember (ITS)

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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
Sarjana Komputer (S.Kom)	Ba Informatics (BIP)	ASIIN-Seal for Degree Programmes	BAN-PT (National Accreditation Agency for Higher Education, Level A, 2006-2021)	TC 04
Magister Komputer (M.Kom)	Ma Informatics (MIP)	ASIIN-Seal for Degree Programmes	BAN-PT (Level A, 2006-2022)	TC 04
Sarjana Komputer (S.Kom)	Ba Information Systems (BISP)	ASIIN-Seal for Degree Programmes	BAN-PT (Level A, 2007-2022)	TC 04, 07
Magister Komputer (M.Kom)	Ma Information Systems (MISP)	ASIIN-Seal for Degree Programmes	BAN-PT (Level B, 2006-2021)	TC 04, 07
<p>Date of the contract: 01.07.2020</p> <p>Submission of the final version of the self-assessment report: 01.09.2021</p> <p>Date of the online visit: 21.-23.09.2021</p> <p>Online visit</p>				
<p>Peer panel:</p> <p>Prof. Dr. Rüdiger Reischuk, University of Lübeck (speaker)</p> <p>Prof. Dr. Heribert Vollmer, University of Hannover</p> <p>Canggih Puspo Wibowo, KeData Indonesia</p> <p>Tiara Lakita, Student at Hasanuddin University</p>				

¹ ASIIN Seal for degree programmes.

² TC: Technical Committee for the following subject areas: TC 04 - Informatics/Computer Science.

Representative of the ASIIN headquarter: Dr. Iring Wasser	
Responsible decision-making committee: Accreditation Commission for Degree Programmes and Quality Assurance Systems	
Criteria used: ASIIN General Criteria, as of December 10, 2015 Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of March 29, 2018	

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
Informatics	Bachelor of Informatics	–	IQF level 6 which corresponds to EQF level 6	Full time	Joint programme with Fontys University (Holland), University of Queensland (Australia), and Newcastle University (Australia)	8 semesters	150 SKS equivalent to 240 ECTS (1 SKS = 1.6 ECTS)	Annually / June-August
Informatics	Master of Informatics	–	IQF level 8 which corresponds to EQF level 7	Full time	Joint programme with Massey University (New Zealand), Kumamoto University (Japan)	4 Semesters	74 SKS equivalent to 122 ECTS (36 SKS with additional activities equals 38 SKS)	Annually / June-August
Information System	Bachelor of Computer Science in Information Systems	–	IQF level 6 which corresponds to EQF level 6	Full time	Joint Programme with Fontys University (Holland)	8 semesters	150SKS equivalent to 240 ECTS (1 SKS = 1.66 ECTS)	Annually / June-August
Information System	Master of Information System	–	IQF level 8 which corresponds to EQF level 7	Full time	Double Degree with National Cheng Kung University (Korea)	4 semesters	74 SKS equivalent to 118.4 ECTS (36 SKS with additional activities equals 38 SKS)	Bi-annually on July and December

³ EQF = The European Qualifications Framework for lifelong learning

B Characteristics of the Degree Programmes

For the Bachelor's degree programme Informatics the institution has presented the following graduate profile in its self-assessment report: graduates of the BIP are able to

1. apply competencies in algorithms and programming, computer network architecture, software engineering, applied modelling and computation, intelligent computing and vision, net-centric computing, graphics interactions and game, and intelligent information management.
2. solve problems in the community and take part in the improvement of human life quality.
3. perform continuous refinement on learning process.
4. be competitive, both ethically and professionally, on the national or international level.

For the Master's degree programme Informatics (MIP), graduates of the MIP are capable of

1. conducting research in basic computer science knowledge (net centric computing, software engineering, and intelligent computing and vision) and specific areas such as graphics interactions and game, or intelligent information management, modelling and applied computation, computer networks and architecture.
2. solving problems in the community and taking part in research to improve human life quality.
3. performing continuous refinement of their learning process.
4. being competitive, both ethically and professionally and delivering ideas both orally and in writing.

As regards the Bachelor's degree programme Information Systems, the corresponding profile is described as follows: graduates are expected to have acquired/demonstrate:

1. skills in designing and analysing information systems requirements for organizations.
2. skills in designing project development in the context of information systems comprehensively incorporating aspects of IT infrastructure (information technology), such as hardware, software, networks, data, organizational hierarchy, processes, and procedures, as well as human and cultural resources, and policies and regulations.
3. basic skills and advancements in the application and development of software, network infrastructure, maintenance of the organization's information management system.

Finally, for the Master's degree programme Information Systems the institution has presented the following profile in its self-assessment report:

The graduates are able to

1. derive and develop scientific methods of Information Systems for difficult and complex problems, both in practice and in research
2. apply them together with the corresponding findings
3. take up a scientific occupation with the aim of obtaining a doctorate.

C Peer Report for the ASIIN Seal

1. The Degree Programmes: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of the degree programmes (intended qualification profiles)
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Evidence:

- Self-assessment report
- Websites of all degree programmes
- SSC 04 and PLOs Relationship for Our Degree Programmes
- Graduate Profiles for Degree Programmes

- Description of learning outcomes for individual modules
- Module handbook for each programme
- Reports of tracer studies for bachelor and master programmes (only in Indonesian language)
- Meeting with Programme Coordinators on 21.09.2021
- Meeting with partners from the industry/private sector on 23.09.2021
- Swot analyses of the Informatics programmes
- Study success and dropout rates

Preliminary assessment and analysis of the peers:

The faculty presents a description of the intended programme learning outcomes and competence profiles in its Self-Assessment Report (see the introductory part of this report). The formulated objectives and learning outcomes of the degree programmes are the product of discussions with important internal and external stakeholder systematically taking into account both national and institutional requirements, the faculties own SWOT analyses, expected graduate profiles, standards determined by the Indonesian Higher Education Association and the results of benchmarking exercises with other higher education institutions. However, as the peers notice during the audit meetings, the students do not take part in the discussions regarding the further development of the programmes, including the learning outcomes. Student feedback should be systematically gathered in the future to adequately consider their interests and opinions.

The competence profiles of all programmes have also been matched to ASIIN's Subject-Specific Criteria (SSC) for Informatics. The programme learning outcomes are transparently communicated to interested students and the general public, the websites offer information in both English and Indonesian language with certain qualitative differences that can be observed between the programmes.

While the description of learning outcomes for individual modules is found to be very detailed in all course portfolios and module handbooks, the expert panel observes that the description of the overarching programme objectives are at times very general. A more concrete formulation of the learning outcomes for the individual programmes could facilitate comprehension and their measurement. Particularly in the specific case of the programmes of Information systems, the experts find that the definition of learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more

precisely to illuminate the exact profile of the programmes and the differences to the informatics study programmes.

The experts also note a mismatch regarding the use of the term “research” in the learning outcomes of modules and courses and the overarching programme learning outcomes. According to the self-report, only the master programme in Information Systems explicitly addresses this aim. After a thorough analysis of the information provided and the interviews with all stakeholders, the expert team concludes that all programmes under review are of an applied nature and that many of the activities labelled as “research” should more adequately be called “development” so that as a general term, “research and development” would be appropriate. They recommend clarifying this in the module descriptions as well as on the websites. The research aspirations formulated in the Self-Assessment Report would need to be underpinned and further substantiated to be justified.

All interviewed stakeholders (students, teaching staff, alumni and industry representatives) convey an overall positive impression regarding the programmes under review and student evaluations indicate a high degree of satisfaction.

Graduates are reported to have excellent job perspectives. Survey data provided by the institution⁴ suggests that 85% of ITS alumni enter their first job immediately after graduation (a considerable number is already recruited prior to graduation) and the average waiting period of most graduates is between 3 and 6 months. The same reports show that over 90% of graduates work in their respective fields of expertise. The SWOT analysis of the Bachelor of Informatics states that graduates of the programme are subject to an intense competition to obtain jobs given the high number of similar programmes in other universities in Indonesia.

The study programmes maintain a close contact with representatives of the industry and regular discussions between the two are regularly organized. Representatives of the industry indicated during the interviews that the graduates of the programmes are regarded to be well-qualified also in comparison to graduates from other Indonesian universities and

⁴ The original documents with the results of the tracer studies can be found only in Indonesian language.

show a fast pace to learn new things. Alumni are also generally satisfied and display a strong sense of belonging.

Criterion 1.2 Name of the degree programmes

Evidence:

- Self-assessment report
- Decree of the Directorate General of Learning and Studentship number 46/ B/ HK/ 2019 on the name of study programme in higher education
- Meeting with Programme Coordinators on 21.09.2021
- Meeting with partners from the industry/private sector on 23.09.2021
- SWOT analyses of the Informatics programmes

Preliminary assessment and analysis of the peers:

The institution provides a detailed historical background of the creation of all the programmes under consideration. The names of the programmes have been defined based on a series of regulations and standard curricula provided by relevant academic and professional associations. This has been done with the aim of guaranteeing that the degrees' terminologies are in accordance with the ones used by the subject-specific community.

One exception mentioned in the institution's own self-assessment report relates to the labelling of the programmes of Information Systems with their multidisciplinary content at the crossroad between informatics, business and project management. According to ITS, the name "Information systems" is not yet fully established for study programmes in Indonesia. Interviews with different stakeholders during the online visit suggest that the difference of terminology between Informatics and Information Systems needs to be further sharpened (see criterion 1.1).

The experts consider the titles of the programmes as adequate, provided the programme learning outcomes for the programmes in information systems are further specified and differentiated.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- Guidelines for the design of higher education curriculum in the industrial era 4.0 (Provided only in Indonesian language)

- Guidelines for curriculum evaluation
- Indonesian Qualification Framework Presidential Decree No. 8/2012: Implication and implementation strategies
- Curriculum Guidelines for Undergraduate Degree Programmes in Computer Science
- Curricular overviews for all programmes
- Meeting with Programme Coordinators on 21.09.2021
- Meeting with partners from the industry/private sector on 23.09.2021

Preliminary assessment and analysis of the peers:

Detailed curricula with supporting course handbooks containing detailed module descriptions are presented to the experts. Each course contains prerequisites, thereby establishing the sequence in which the courses are to be taken to ensure that students acquire the necessary knowledge and skills in the relevant areas. In the first semesters, the curricula convey a common base of fundamental subjects whereas in later stages students have more flexibility to be able to pursue their preferred field of interests. Curriculum assessments for each degree programme are performed regularly among stakeholders to consider suggestions for improvement. This feedback is gathered through surveys after each graduate period (bi-annual fall and spring).

In spite of some limitations resulting from national regulations (see below), the experts conclude that the general structure of the curriculum follows a well-structured educational approach which is suitable to guarantee the achievement of reasonable learning outcomes. Nevertheless, the analysis of the curriculum as well as the interviews with different stakeholders results in a certain number of expert findings for improvement:

The meeting with partners from the industry and private sector suggests that more attention should be paid boosting the level of soft skills for the graduates of all programmes. Room for improvement was seen in areas such as critical thinking, communication and leadership skills. The experts support these findings and suggest putting a renewed emphasis on developing these skill sets to further improve the employability prospects of graduates.

As regards the **introductory phase** of the two Bachelor programmes under review, a considerable proportion of the programme is devoted to courses in Pancasila, Religion, Indonesian language, English as well as natural sciences. While the peers realise that many of these modules are mandatory due to government regulations, they recommend reconsidering the benefit of certain optional courses/modules (i.e. chemistry might better be re-

placed by courses on economics or biology) for the expected educational profile of the informatics and information systems graduates. During the discussion, the programme coordinators point to the fact that this course structure has been implemented on the level of the university in its quest to fulfil national regulations. The peers understand that national regulations have to be taken into account, but nonetheless request a more content-oriented line of argument related to curriculum design.

With regards to all programmes under review, the peers acknowledge that they focus on applications, but that they could benefit from strengthening the theoretical basis and scientific foundations.

Concerning the **Bachelor in Informatics**, one example in case is the course "Graph theory and automata" designed to provide the theoretical background regarding automata, grammars and computability theory. The course, offered late in the 6th semester, has only 3 credits and is designed to familiarize students with graphs, graph representations and basic foundations of theoretical computer science such as grammars, automata, and complexity. The experts consider it too late in the course of study to lay these foundations. Furthermore they suspect that since the module seems overloaded with content, in the limited time some of the treated topics cannot be covered in sufficient depth.

As regards the **Bachelor of Information Systems**, the peers observe that it is of a highly applied nature. Given the programme learning outcomes and the interdisciplinary nature of the programme, the experts plead for strengthening the economic foundations in the curriculum. For the same reason, the experts see potential in upgrading the entrepreneurial skills of future graduates, which according to the learning outcomes also should be equipped for creating their own start-ups.

The analysis of the master programme of Informatics has even more shown a lack of emphasis on scientific foundations and theory concerning business management. The students also express their wish to be presented with foundations and not only applications; this refers to economic foundations for courses in information systems, mathematical foundations for data analysis or computer graphics, automata and complexity for courses on algorithms, etc.

Criterion 1.4 Admission requirements

Evidence:

- Self-assessment report
- Academic regulation for academic education programmes

- Websites of the programmes

Preliminary assessment and analysis of the peers:

The analysis of the available information shows that there are clear rules regarding access paths for different student groups. A complete list of general and specific requirements for each programme has been provided as part of the self-assessment report. There are different admission schemes both at the national and the institutional level. The experts take note of the fact that the selection processes for the programmes under review are highly competitive and selective in line with the aspirations of the institution to belong to the very best Indonesian higher education providers.

Prospective students must fulfil a variety of requirements (including admission tests) and submit a great deal of documents including English language proficiency documents, recommendation letters and resumes. In the case of the master programmes, prospective students need to submit concrete research plans before enrolling in the programmes. The information on the number of available study places is communicated in advance on the SMITS ITS website. Concrete information about admission requirements as well as the procedures to apply can also be found online, except in the case of the Bachelor programme of Information systems, for which this information should be added. This means that for most of the programmes under consideration the information on admission is standardized and transparent for all prospective students and the general public.

Overall, the experts find that the admission requirements are suitable for guaranteeing the achievement of intended programme learning outcomes. An exception to this rule is that students with colour-blindness are currently not eligible for admission, for which no compelling reasoning is given. This must be changed to offer a more inclusive educational environment.

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

With regards to the learning outcomes of the programmes in Information Systems, ITS announces that they will be revised soon in line with the peers' comments. The noted issues concerning the term "research" shall be addressed in the same process. Moreover, ITS declares that they will consider restructuring the curricula in the areas that have been discussed above. Lastly, the faculty announces to suggest to abolish the university-wide rule that people with colour-blindness cannot be admitted.

The peers appreciate ITS' plans and stick to their envisaged requirements and recommendations until these have been implemented. They consider criterion 1 partly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-assessment report
- Academic regulation for academic education programmes
- BIP Courses roadmap
- Information systems programme courses
- MIP Courses Roadmap
- Courses and Curriculum of MISIP
- Quality standards of internship programme for applied and undergraduate study programme
- Module handbook BIP, BISP, MIP. MISIP
- Meeting with Teaching Staff on 22.09.2021
- Meeting with partners from the industry/private sector on 23.09.2021

Preliminary assessment and analysis of the peers:

All degree programmes under review are clearly divided into modules with detailed information on the expectations in terms of teaching and learning. Courses are classified according to five criteria: national compulsory, ITS compulsory, basic science and math, bachelor degree specific, and so-called enrichment courses. In conducting lectures, degree programmes provide attendance sheets and lecture monitoring sheets, as stated in the lecture contract and Semester Learning Plan for each course. Following ITS policy, all the bachelor degree programmes ensure that students graduate on time according to the standard length of study. This regulation is attached to the Student Handbook document which students receive at the beginning of lectures at ITS. The document is available only in Indonesian language (<http://its.id/studenthandbook>).

Each bachelor degree programme has several specialization groups that support its respective undergraduate profile qualifications. The students have the right to choose one of these. Depending on the degree programmes between 10 % (bachelor programmes) and

up to 33% (master programmes) of elective courses can be chosen. The experts commend the faculty for providing electives as part of these specializations, even if the number of interested students is very small. Guidance for choosing a specialization is provided by individual professors and mentors of students, which seems to be working. The experts nevertheless see value in providing additional orientation by grouping the electives for each specialization in a written form. An improvement of this matching between electives and specialization areas would also be beneficial for an early identification of career paths.

Based on the ITS Academic Regulations, there are clear and transparent rules in place to recognize student credentials obtained inside and outside the institution. Special Arrangements are also in place to reward students with high academic achievements. One example is the chance to graduate in less time than expected as an incentive. In the case of the master programmes with a focus on research, credits are awarded for various publications formats such as journals, conferences, or seminars.

Statistics show a high degree of student success in all study programmes. Comparative data was provided for the Informatics degree programmes regarding student intake, progression and dropouts. The numbers show a highly competitive student intake and low to non-existent dropout rates. For the programmes of Information systems similar numbers were not made available.

All students, both in bachelor and master degree programmes, are given the opportunity to apply for internationalization activities, though a comparatively small number of students takes advantage of them. There are a number of joint programmes in place with partner universities in Great Britain, Australia, New Zealand, Japan and Korea, which are however not the object of this accreditation exercise and report.

In the framework of the study programmes under review, there are a number of on the job-training phases of approximately one month in a company. In the discussions with various stakeholder groups, the experts clearly identify room for improvement as regards the organization, lengths and structure of the internship. The programmes seek to prepare graduates for a successful integration into the labour market. However, the duration of the internship scheme should be evaluated. This view is confirmed by the interviews with partners from the Industry and Private Sector who voiced concerns regarding the duration in view of the necessary training for new interns. The programme coordinators share this view and point to the existence of a new national internship scheme currently put in place providing students with an opportunity of a six-month internship in a company. Furthermore, according to the students, there are sometimes problems with the recognition of

internships, which have to be solved. Due to these observations, the internship experience needs to be remodelled.

Overall, the experts find the structure of the programmes under review suitable to achieve the intended learning outcomes. Whereas the bachelor programmes display a high extent of structure, the master programmes are characterized by a great deal of flexibility and individual choice. Nevertheless, this is an area where the expert committee sees room for improvement to offer master students more guidance to select appropriate courses.

Criterion 2.2 Work load and credits

Evidence:

- Self-assessment report
- Academic regulation for academic education programmes
- Meeting with Students on 22.09.2021
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

The regulation regarding work load and credits at ITS is based on the National Higher Education Standards which regulate several aspects such as the minimum credit calculation of student workload, the maximum period of study, the definition of credit unit, and others. The number of ECTS of each semester varies depending on the degree programme. The curricula of the programmes under scrutiny use a different term for course credits. Credits are called SKS (Satuan Kredit Semester in Indonesian). One SKS refers to 50 minutes (usually extrapolated to one hour by assuming 10 minutes break) of teaching activities, 60 minutes of student self-learning outside class schedule, and 60 minutes of independent work. 1 Indonesian credit point (SKS) is thus equivalent to approximately 1.6 ECTS.

Students are assisted in planning their study load by filling an online study plan form (FRS) through the academic management information system according to the ITS academic calendar. They are obliged to consult with their academic advisors and ask them for approval, including the number of credits they are allowed to take and discuss any study load problem they experienced during the previous semester. In addition to the educational load of students in the degree programme, ITS recognizes student learning outcomes obtained

from formal or non-formal education and/or work experience into formal education. Students are required to fill in the questionnaire of learning satisfaction for each course at the end of every semester, including their rate of workload satisfaction.

The expert panel notes that there is a clear definition of credits as well as measurement and transfer mechanisms in place for student achievements outside the institution.

Generally, the peers consider the work load of the courses adequate. However, in some cases, it appears as if the content of the courses can hardly be taught in the required depth given the number of credit points. Some example for this are the courses “Graph Theory and Automata” and “Digital Image Processing”. In these cases, ITS should revise the content of the courses to ensure that they can be reasonably taught in the allocated time.

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report
- Survey on Lecturers & Staffs Service and Infrastructure Quality
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

Based on regulations by the Ministry of Education and Culture the learning system in ITS emphasizes a student-centred approach. Different teaching methodologies are applied to address a variety of themes while working with both small and larger groups. Evidence gathered during the online visit shows that there is a tendency towards smaller groups and a highly individualized student-teacher interaction. Lecture activities are currently applied through virtual teaching modes in the face of the pandemic but there is also blended learning when necessary to combine face-to-face meetings in class and synchronous/asynchronous online sessions. There are clear rules to restrict the number of teaching hours of the staff.

During the interviews with different stakeholders, the expert team observes a high commitment of the teaching staff to educate their students. Moreover, the staff-student ratio can be regarded as sufficient in general. Available survey data from the Bachelor of Information Systems show a high level of satisfaction of the majority of students in the areas of

lecturers' availability to support learning & teaching processes, coaching sessions and service provision. Similar data in the case of other programmes has thus far not been provided.

During the preliminary assessment of the data provided by the institution, further information was requested regarding the methodology used in the faculty to teach students how to do research. The programme coordinators argue that also Bachelor students are expected to engage in research (e.g. solving research questions in their capstone projects). In preparation for these research activities, students enrol in a pre-final project that should be taken before the final thesis. For master students, there is a course of research methodology on offer. Opinions voiced during the interviews with students expressed the need for more basic knowledge foundation in methods on how to solve problems, which is consistent with some observations discussed in the chapter 1.3. Given the differences in teacher qualifications as well as the lack of strong research record in some cases it might be difficult for some members of the academic staff to carry out some of the expected teaching duties successfully. Regarding master students, this can be problematic in terms of the necessary preparation in academic research and writing.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Survey on lecturers and staff service and infrastructure quality (Appendix 4.15.)
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

Through the analysis of available evidence as well as during the online visit, it has become evident that students have access to a wide variety of support and assistance structures which offer assistance in academic and non-academic matters over the entire course of their studies. The experts commend the faculty and the university for assigning a great deal of human resources to take over different responsibilities and roles. Detailed information allowed the peer team to perceive how a concept of personnel duties is in place to provide mutually supportive and integrated services to students. All support and assistance services allow students to achieve their learning outcomes and complete their courses within the

scheduled time. In addition, a comprehensive digital platform at the institution has been institutionalized to allow for students to be regularly accompanied and monitored.

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

The peers thank ITS for providing the requested additional information on students' progress and drop-outs as well as on their satisfaction with teaching in the programmes, which show satisfactory overall results.

They consider criterion 2 fulfilled, but further recommend to evaluate the current mandatory internship scheme, to revise the content of the courses that cannot be realistically taught in the allocated time, and for the Master programmes to group the electives into specialisations.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation
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Evidence:

- Self-assessment report
- Questionnaire about evaluation and assessment (only in Indonesian language)
- Exam schedule (Only in Indonesian language)
- Example of examination rule
- Implementation guide of final project
- Monitoring system of final project and thesis
- On-Job training examination form
- Guidelines for writing master thesis(Only in Indonesian language)
- Standard operating procedure for submitting and defending theses
- Final examination terms and rules
- Final project guideline(Only in Indonesian language)
- Thesis guideline(Only in Indonesian language)
- Sample exams and theses
- Meeting with Students on 22.09.2021

- Meeting with Teaching Staff on 22.09.2021
- Examples of publications of students in the framework of their study programmes

Preliminary assessment and analysis of the peers:

The evaluation of student progress has been officially regulated for each programme and stated in the course learning plan and course portfolio to verify that evaluation and assessment processes are supportive in achieving the intended learning outcomes. A wide range of different exam types (mid-exam, final exam, quizzes, and assignments) are used and the regular evaluations of bachelor and master programmes are carried out through different stages. Students' rights and obligations related to evaluations and assessments can be found in the Academic Regulations of ITS. The regulations stipulate the minimum of attendance and participation to be able to take the examinations and also stipulate what happens in cases where this minimum is not achieved.

According to ITS regulations, students who cannot participate in the regular exams due to illness or other legitimate reasons have the right to be offered a follow-up exam in the same semester. There appear to be no specific rules regarding compensation measures for students with disabilities. The peers ask ITS to clarify whether this is actually the case and if so, they ask the university to draft such regulations so that the students' rights are clearly laid down and they can rely on them.

As previously mentioned, "on the job training" is an important component of the study programmes to prepare students for the labour market. During this exercise, "on the job training" students are supervised by an internal and an external supervisor. Clear rules for the selection of the internal supervisor as well as possible exceptions can be found in the information provided by the institution. The assessment methods to evaluate this phase is comprehensive and includes a written report, a seminar and an oral test.

Both bachelor and master degree programmes are concluded with a final assignment. During the assessment of the information provided, it was observed that the terms are in some cases ambiguous (i.e. thesis vs. final project). It would be important to use a consistent terminology to avoid possible confusion. The final project is expected from bachelor graduates of both programmes. It is considered to be a scientific work based on a research activity or design that trains students to analyse, identify, summarize, and apply all of their learning experiences to solve problems in the Informatics and information systems area. The final project must be done within one or two semesters under the guidance of one or more lecturers from the same department. Detailed and structured information on the supervision mode as well as the prerequisites could be found. There are special rules when it comes to the qualification profile of the main thesis supervisor (doctoral education with a

minimum academic position as lecturer). During the assessment of the content of the examination systems examples of master thesis were examined in detail.

In general, satisfaction was voiced concerning the variety of exams in the programmes. After the analysis of both the conceptual principles used and of examples of different exams and theses on the part of the member of the ASIIN expert team, the examination system is judged to be both effective and adequate. The fact that the evaluations of student performance are carried out through different stages, it is highly beneficial to contribute to high success rates and low dropout rates. During the discussions, the peers learn that international students sometimes have problems with the exams and therefore, it might be worthwhile to consider establishing compensatory mechanisms in line with ITS's internationalisation efforts.

As regards potential areas of improvement, the interviews with the students suggest that a higher degree of transparency is needed in some courses concerning examinations. This is especially the case when it comes to understanding the obtained grades and knowing which contents are to be evaluated at which stage of the evaluation process. The peers could not find the general rules on exams (e.g. how long written exams are, how and how often exams can be repeated etc.). Upon request, further information was provided. However, this information seems to be missing from the official exam regulations. The peers urge ITS to explicitly mention these rules in the official exam regulations.

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

ITS explains that the examination rules are usually contained in the exam schedule, with which students are provided in each semester. The peers appreciate that the students receive this crucial information, but emphasise that this has to be well-anchored in the respective regulations and publicly available.

The peers appreciate that students with disabilities are supported in accordance with their needs, but consider it necessary to establish binding rules for compensation measures for exams on which students can rely. These have to ensure that all students are generally able to participate in the exams on equal footing, regardless of handicaps. Depending on the kind of disability, this could include alternative types of examination, more time or other appropriate measures.

They consider criterion 3 partly fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-assessment report
- Staffing
- Staff handbook: Department of Informatics
- Staff handbook: Department of Information Systems
- Regulation for lecturer's workload
- The assessment result of internal quality assurance system 2018-2020 of the bachelor programme in information systems
- Meeting with programme coordinators on 21.09.2021
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

The institution provides detailed qualitative and quantitative information about the number and qualification level of its staff. The centre for human resource development is in charge of implementing essential procedures to recruit lecturers and administrative staff. According to the self-assessment report there are 83 lecturers in the programmes under consideration. Specific information is available about the qualification levels for the cluster as a whole (48% with a doctoral degree and 52% with a master degree). Regulations of the institution stipulate that lecturers should have doctoral qualifications in order to take over teaching duties at the master's level. There are two types of lecturers recruited (Civil servant and Lecturers non-civil servant) and the legal basis for the recruitment of all staff members is clear and can be found in a variety of written regulations. Around 10% of the teaching staff hold the position of professors. Other positions are filled with Associate Professors (23%), Assistant Professors (59%), and Lecturers (7%). Apart from the teaching staff, there are further staff members responsible for administrative tasks in areas such as academic support, laboratory and technical, financial, and general services.

One important observation is the fact that all professors are almost exclusively recruited "in-house". However, in the framework of the academic programmes students and academic staff have had a certain degree of exposure to external scholars. There is room for improvement when it comes to profiting from the expertise of external as well as international teaching staff. Furthermore, the experts believe that more guest lectures could be

invited from the industry to keep both students and lecturers up to date when it comes to new developments in the respective industries.

The ASIIN expert team commends the faculty for the high commitment of its staff in educating the students. The academic staff-student ratio, stipulated by national regulations, is considered to be sufficient. The experts nevertheless observe the need for a stronger support on behalf of the institutional leadership especially in the area of research activities of the staff, given that they are not always consistently in line with the level of academic qualification aimed at in the master programmes. The peer team observes considerable differences regarding research outputs among the various expertise groups within the academic staff. This observation was also corroborated during the dialogue with the teaching staff and in the results of the internal quality assurance system of the bachelor programme in Information Systems. During the interviews with the students, the publication impact index of the lecturers was also mentioned. Students expressed the desire to have lecturers who conduct more research. These dimensions highly contribute to maintaining quality standards and assuring the perceived quality of the institution both in the country and internationally.

Criterion 4.2 Staff development

Evidence:

- Self-assessment report
- Relief of lecturer workloads
- Payment of additional salary
- Registration of education staff
- Performance measurement for employee
- Incentives
- Meeting with programme coordinators on 21.09.2021
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

The self-assessment report offers detailed information about the measures that are carried out in order to improve the competencies, teamwork and collaboration of lecturers and administrative staff at ITS. Each department has short and long-term plans to support staff careers by allowing every staff member to participate in different trainings during their

tenure. By the same token, lecturers have the opportunity to apply for different scholarships to do joint research at higher education institutions internationally. Other supported activities are cross-laboratory and cross-professional exchange schemes between institutions to increase the capacity of its lecturers. ITS also pays a great deal of attention to the health of its staff and it facilitates routine sports activities.

ITS uses an academic information system to monitor its lecturer's course attendance. The degree programme management periodically evaluates the report of the monitoring system. This procedure aims to ensure that courses are delivered in a timely manner. Students also evaluate lecture activities through a survey at the end of each semester, which the lecturer can use to evaluate their own performance.

During the interviews with programme coordinators as well as teaching staff, several initiatives in the area of staff development were discussed. One example is the close cooperation among senior and junior staff members to close experience gaps. In addition, there are offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills.

Criterion 4.3 Funds and equipment

Evidence:

- Self-assessment report
- ITS annual report for 2019 (<http://its.id/2019-rector-annual-report>)
- Overview of facilities
- Appendix of Department Facilities
- Presentation of the Institution on 23.09.2021

Preliminary assessment and analysis of the peers:

According to ITS annual report available for 2019 as provided by the institution, the funding for ITS comes from several sources, such as government budget (28%) and internal income (72%). The internal income is mostly generated from student tuition fees, industry cooperation, and ITS business units. Moreover, it has been highlighted that ITS as a public university with PTN-BH status (state-owned university) has the ability to support itself financially. The budget is allocated for management and development (15%), internet bandwidth, library and student activity support (4%), facility and building management (13%), research

funding and society services (24%), and staff salary (44%.) In addition, there are also research grants acquired by lecturer staff for developing research activities.

Given that the facilities were not visited in the framework of the online-visit, the following information has been extracted from the self-assessment report. Video and picture footage was presented during the online visit. ITS has education facilities located in Sukolilo on an area of 182 hectares which can accommodate various academic and non-academic activities for students, lectures, and its employees. Some facilities and infrastructures are shared with the public. Furthermore, each degree programme has allocated facilities and equipment for academic activities. The classrooms are equipped with LCD, Air Conditioners and Wi-Fi connections. For bigger classrooms, they are installed with audio-visual facilities that function to amplify the lecturer's voice when giving lectures. The equipment needed for safety, such as fire extinguishers, are available in each laboratory, administration room, library, and classroom.

The assessment of the available data provided from the institution as well as the pictures and videos that were presented during the online visit allow to state that ITS has sufficient available funds and equipment to provide excellent academic conditions to its students. The central information system named "MyITS SSO" offers easy access to structured information in the main information systems of the institution.

The institution managed to deal successfully with the shift from exclusively offline to a primarily online teaching mode during the pandemic. However, given constant new technological demands, it is advised to regularly check the suitability of the necessary technical infrastructure. During interviews with both students and teaching staff some difficulties were mentioned in this area (i.e. insufficient server capacities to register for courses, remote access issues etc).

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

The peers thank ITS for providing the requested information on the teaching staff's workload and they recognise that the workload is generally adequate and appropriately distributed among the teaching staff. ITS explains that it has established a system of financial support of research for all teaching staff in all programmes. Nonetheless, considering the mentioned observations, the peers think that further support for research could be offered.

They consider criterion 4 fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Self-assessment report
- Module handbook BIP, BISP, MIP, MISP
- Meeting with programme coordinators on 21.09.2021

Preliminary assessment and analysis of the peers:

The expert team examines all the module descriptions of the programmes under review. All module descriptions are accessible and detailed to a high extent. The following information can clearly be found for all programmes: person in charge of the module, module identification, credit points, intended learning outcomes, module content and recommended literature. When it comes to teaching method(s) and workload some differences were also identified. Whereas some programmes have very detailed information about the type of teaching formats some programmes offer only vague information on this matter. In terms of the admission and examination requirements gaps can be identified regarding the specificity of the information provided. The information on form(s) of assessment and details explaining how the module mark is calculated should also be reviewed in order to increase the transparency of the examinations (see examinations). One last observation is that the date of last amendment made to the module description cannot be found in any of the programmes reviewed. It can be concluded that despite certain inconsistencies and missing information that has been identified the institution has a very detailed course portfolio and well elaborated module handbooks.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-assessment report
- Exemplary Graduate Certificate
- Exemplary Transcript and Diploma Supplement
- Exemplary translation of the Graduate Certificate
- Additional information on the process to translate graduate certificate (<https://www.its.ac.id/burb/id/translate-ijazah/>)

Preliminary assessment and analysis of the peers:

Successful students who fulfil all requirements receive a graduate certificate together with a Diploma Supplement upon graduation. The institution provided the expert team with an example of a graduate degree of the bachelor of Information systems both in Indonesian language and an English translation. The original certificate includes a picture of the individual who graduated. The English version contains the same information without the picture and a confirmation that the translation is official.

The peer team also had the possibility to check two examples of diploma supplements of both the bachelor programmes in Informatics and Information systems. The diploma supplements contain detailed information in both Indonesian and English about the following:

- Information identifying the holder of diploma supplement.
- Information identifying the awarding institution (in this section the grading procedure on which the final mark is based are explained in a way which is clear for third parties).
- Information identifying the qualification and outcomes obtained (Learning outcomes, activities, achievements and awards).
- Information on the Indonesian Qualification Framework.

After reviewing all documents it can be concluded that the information is complete, well-structured and useful to clarify any questions that may emerge regarding the educational experience of its graduates.

Criterion 5.3 Relevant rules

Evidence:

- Self-assessment report
- Academic Regulation For Academic Education Programmes
- Final examination terms and rules
- Further information on Students' Right and Duties (<http://its.id/studentsrightandduties>)

Preliminary assessment and analysis of the peers:

The peers acknowledge the provision of detailed information during the preliminary assessment as well as the discussions that took place during the online visit. Relevant rules can be divided into the following sections to name a few:

- External regulations that shape the institution's scope for action (i.e. national frameworks).

-General regulations within the institution that influence the faculties (i.e. rector's decrees).

-Quality Standards for Graduate Programmes.

-Rules on admission.

-Rules on examinations (i.e. Regulation For On Job Training, Examination Rule, Implementation Guide of Final Project, Guidelines for Writing Master Thesis).

-Regulations on Staffing.

-Students Ethic Code.

The peers could obtain an adequate overview of the rules and regulations that influence the development of the programmes under consideration. The rights and duties of all stakeholders are well defined, are mentioned in different sections of the self-assessment report and can be accessed by both students and staff through different channels. From the discussions, which took place during the online visit, it can be concluded that all members of the institution are well informed about the relevant rules and procedures.

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

ITS announces to add the date of last amendments to all module descriptions. The peers appreciate this, but further recommend to address the other missing information and inconsistencies noted above. They consider criterion 5 fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- The assessment result of internal quality assurance system (SPMI-ITS) 2018-2020 of bachelor's programme in Information Systems
- The assessment result of internal quality assurance system (SPMI-ITS) 2018-2020 of master's programme in Information system
- Performance Achievement Contract

- Meeting with programme coordinators on 21.09.2021
- Meeting with Teaching Staff on 22.09.2021

Preliminary assessment and analysis of the peers:

Detailed information related to the structure and functioning of the internal and external quality assessment system and the development of all degree programmes under review are presented. The peers value the possibility to obtain a comprehensive picture of the complex quality assurance concept of the institution. In general terms, two kinds of quality assurance systems (internal and external) are used for all degree programmes.

ITS disposes of a Quality Assurance Office (KPM), which 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, i.e., Faculty Quality Team (TMF), Department Quality Team (TMD), and Degree programme Quality Team (TMP). The following measures have been implemented to gather information about a variety of qualitative aspects of the institution:

- SPMI evaluation: The SPMI evaluation is carried out online annually in September of each year. The instrument measures a series of variables which are divided into concrete indicators.
- SIPMONEV / Performance: Through this system planning, monitoring, and evaluations are possible. The results of department performance can be accessed online, with verification twice a year (July and December).
- Evaluation of the lecturer learning process: Students express their level of satisfaction with the teaching staff every semester. This process is also conducted online.
- Evaluation of planning, implementation, and learning outcomes: Another system of quality assurance tracks learning objectives (average score), PDCA documentation, and learning outcomes. Targets/objectives are filled in at the beginning of each semester in stages from the Institute, Faculties, Departments, RMK, and Lecturers. Portfolios and Action records are also recorded in the system. At the end of the lecture, the goals and achievements will be recapitulated by the system.
- Curriculum Evaluation: Review and improvement of the Degree programmes curricula are carried out every 4 (four) years. This curriculum evaluation aims to discuss elective courses and provide flexibility in keeping up with the latest technological developments.
- Monitoring of the teaching attendance of lecturers: This is done for each course and reported every 4 weeks. The percentage of teaching attendance is monitored each semester and will be used as one of the performance incentives factors.

- Involvement of all stakeholders in the internal quality assurance process: External stakeholders (such as alumni, advisory boards, and alumni users) provide input and suggestions through discussions and questionnaires organized by the degree programmes.
- Tracer studies: The graduate surveys are conducted annually by the Career and Student Entrepreneurship Center.

The external Quality Assurance System of Higher Education in Indonesia is implemented by means of the accreditation process. All four-degree programmes under consideration renew their national accreditation from BAN-PT every five years.

The expert team is able to witness that the institution invests a great deal of resources in quality assurance mechanisms. During the preliminary assessment, the peers had the chance to review the results of evaluations conducted of the programmes of Information Systems for the period 2018-2020. Similar data for the programmes of Informatics were not available. Some areas that were identified as lacking (e.g. average research performance index for lecturers at the management unit per year, average lecturer workload per semester) were discussed over the course of the online visit. Data from results of tracer studies has been also quoted from the self-assessment report, given that the reports are only available in Indonesian language.

With regards to the course evaluation surveys, the peers learn that the students fill these out directly through ITS's IT system and that they are directly linked to their student ID. Therefore, it appears that the students' feedback is not guaranteed to be anonymous. To facilitate honest feedback and criticism, the university has to ensure that these surveys are absolutely anonymous.

Previous results of the institution's internal quality assurance mechanisms have pointed out some deficiencies and areas of improvements. There seems to be a lack of a concrete written action plan to address these in the short term and a strategy to disseminate this information among members of the student body. It has been noted during the analysis of documents as well as the discussion with different stakeholders that further efforts should be taken in order to close various quality assurance cycles.

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

The peers thank ITS for providing an action plan that attempts to address the areas of improvement identified by the internal quality assurance system. They consider criterion 6 partly fulfilled. First, ITS has to ensure that the students course evaluation surveys are

anonymous. Furthermore, the peers recommend to consistently implement a comprehensive follow-up procedure regarding the results of all internal quality assurance processes to ensure that the results contribute to the continuous improvements of the programmes and the institution. Furthermore, they suggest to strengthen the students' involvement in these formal processes.

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:

- D 1. - Workload of the teaching staff for each individual staff member (Matrix).
- D 2.- Action plan for the faculty to improve identified weaknesses.
- D.3.- Specialization profiles with regard to selection of electives.
- D 4.- Detailed statistical data for the Information systems programmes regarding new students that enter every year, dropouts as well as success rates and statistics about alumni.
- D 5. Results of evaluations conducted of the programmes of Informatics (similar to appendix 6.1 and 6.2).
- D 6. Survey on Lecturers & Staffs Service and Infrastructure Quality for the programmes of Informatics

E Comment of the Higher Education Institution (07.11.2021)

The institution provided a detailed statement as well as the following additional documents:

- Workload of individual teaching staff

- Faculty action plan
- Specialisation profiles for electives
- Statistical data on Information systems programmes
- Results of evaluations in Informatics programmes
- Survey on lecturers' and staff's service and infrastructure quality for the Informatics programmes

F Summary: Peer recommendations (15.11.2021)

Taking into account the additional information and the comments given by ITS, the peers 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 Informatics	With requirements for one year	30.09.2027	–	--
Ba Information Systems	With requirements for one year	30.09.2027	–	--
Ma Informatics	With requirements for one year	30.09.2027	–	--
Ma Information Systems	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

- A 1. (ASIIN 1.1, 5.1) The distinction between “research” and “development” has to be made clearer in the description of the modules and learning outcomes.
- A 2. (ASIIN 1.4) In the absence of reasonable explanations, prospective students with colour-blindness have to be eligible for enrolment in the programmes.
- A 3. (ASIIN 3) The exam regulations need to be well-anchored and made publicly available.
- A 4. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.
- A 5. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

For the Bachelor’s and Master’s degree programmes Information systems

- A 6. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the to the informatics study programmes.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to further strengthen the soft skills, particularly regarding critical thinking, communication and leadership, of the graduates.
- E 2. (ASIIN 1.3) It is recommended to strengthen the theoretical basis and the scientific foundations of the programmes.
- E 3. (ASIIN 2.1) It is recommended to evaluate whether the current internship scheme adequately contributes to providing students with significant experience of the labour market.
- E 4. (ASIIN 2.1, 2.2) It is recommended to revise the content of those courses that can currently not be taught realistically in the allocated time.
- E 5. (ASIIN 4.1) It is recommended to offer more support to the academic staff in terms of research activities.
- E 6. (ASIIN 5.1) It is recommended to review the module descriptions to complete the identified missing information and solve the certain inconsistencies.
- E 7. (ASIIN 6) It is recommended to consistently implement a comprehensive follow-up procedure regarding the results of internal quality assurance processes. Thereby, students should be involved to a greater degree in these formal processes.

For the Bachelor's degree programmes

- E 8. (ASIIN 1.3) For the introductory phases of the programmes, a content-oriented evaluation of the added value of the not informatics specific courses for the achievement of the expected academic profile is recommended.

For the Master's degree programmes

- E 9. (ASIIN 2.1) It is recommended to group the electives into specialisations in order to better support the students to select a meaningful study plan.

For the Bachelor's and Master's degree programmes Information systems

- E 10. (ASIIN 1.3) It is recommended to put a stronger emphasis on economic foundations so that graduates can adapt to applying information systems for enterprises more effectively.

G Comment of the Technical Committees

Technical Committee 07 – Business Informatics/Information Systems (23.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee considers the first version of the report an insufficient base for giving its suggestion. The committee members agree that some of the proposed requirements and recommendations are very general and not adequately substantiated by the report. Therefore, the committee consults with the peers and asks for a revised list of requirements and recommendations that more precisely addresses the issues mentioned in the report. After this revised list has been provided, the Technical Committee concurs with it and only suggests a slight change in wording in recommendation E 10.

The Technical Committee 07 – Business Informatics/Information Systems recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Information Systems	With requirements for one year	30.09.2027	–	--
Ma Information Systems	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

- A 1. (ASIIN 1.1, 5.1) The module descriptions of the Master programs should reflect that students are not required to perform fundamental research but research and development. This concerns in particular the modules “Thesis Proposal” and “Thesis – Scientific Publication”.
- A 2. (ASIIN 1.4) Applicants who are color-blind may not be excluded from admission.
- A 3. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.

A 4. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

For the Bachelor's and Master's degree programmes Information systems

A 5. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the to the informatics study programmes.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to further strengthen the soft skills, particularly regarding critical thinking, communication and leadership, of the graduates.
- E 2. (ASIIN 1.3) It is recommended to strengthen the theoretical basis and the scientific foundations of the programs.
- E 3. (ASIIN 2.1) It is recommended to improve the structure and organization and to increase the length of the internship in order to provide students with significant experience of the labor market.
- E 4. (ASIIN 2.1, 2.2) It is recommended that overloaded modules are either held with more weekly teaching hours (and are then higher credited) or split into different modules. This concerns in particular the module "Graph and automata theory".
- E 5. (ASIIN 4.1) It is recommended to offer more financial and organizational support to the academic staff in terms of research activities.
- E 6. (ASIIN 6) It is recommended to use the results of internal quality assurance processes more systematically in order to identify points that need improvement.
- E 7. (ASIIN 6) It is recommended to broaden the students' involvement in the constant development of the programs; in particular, student representatives should be involved in the relevant decision-making bodies.

For the Bachelor's degree programmes

E 8. (ASIIN 1.3) It should be evaluated in how far the general modules in the first two semesters (especially chemistry) are relevant for the competence profile of the programs.

For the Master's degree programmes

E 9. (ASIIN 2.1) It is recommended to group the electives into specializations in order to better support the students to select a meaningful study plan.

For the Bachelor's and Master's degree programmes Information systems

E 10. (ASIIN 1.3) It is recommended to put a stronger emphasis on foundations in business administration and management so that graduates can adapt to applying information systems for enterprises more effectively.

Technical Committee 04 – Informatics/Computer Science (26.11.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and mostly agrees with the assessment of the peers. However, it suggests several changes to the proposed requirements and recommendations: Regarding requirement A 1, it changes the wording to stress that it is fundamentally about the graduates' skills. Instead of recommendation E 4, a new requirement

A 5 is suggested that refers to the general problem which is to be solved, namely that the credit points do not always adequately reflect the students' workload. With regards to recommendation E 3, the Technical Committee is opposed to demanding longer internships, as long practical phases are not common in computer science programmes. Therefore, the recommendation should focus on the critical issues of structure and organization of the internship.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Informatics	With requirements for one year	30.09.2027	–	--
Ba Information Systems	With requirements for one year	30.09.2027	–	--
Ma Informatics	With requirements for one year	30.09.2027	–	--
Ma Information Systems	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

A 1. (ASIIN 1.1, 5.1) Module descriptions of the master programs must reflect that students are required to acquire research and development skills rather than fundamental research skills. This concerns in particular the modules "Thesis proposal" and "Thesis – Scientific Publication".

- A 2. (ASIIN 1.4) ITS must not exclude students from admission on the grounds of colour-blindness.
- A 3. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.
- A 4. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.
- A 5. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students.

For the Bachelor's and Master's degree programmes Information Systems

- A 6. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the informatics study programmes.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to further strengthen the soft skills, particularly regarding critical thinking, communication and leadership, of the graduates.
- E 2. (ASIIN 1.3) It is recommended to strengthen the theoretical basis and the scientific foundations of the programs.
- E 3. (ASIIN 2.1) It is recommended to consider improving the structure and organization of the internship.
- E 4. (ASIIN 4.1) It is recommended to offer more financial and organizational support to the academic staff in terms of research activities.
- E 5. (ASIIN 6) It is recommended to use the results of internal quality assurance processes more systematically in order to identify points that need improvement.
- E 6. (ASIIN 6) It is recommended to broaden the students' involvement in the constant development of the programs; in particular, student representatives should be involved in the relevant decision-making bodies.

For the Bachelor's degree programmes

E 7. (ASIIN 1.3) It should be evaluated in how far the general modules in the first two semesters (especially chemistry) are relevant for the competence profile of the programs.

For the Master's degree programmes

E 8. (ASIIN 2.1) It is recommended to group the electives into specializations in order to better support the students to select a meaningful study plan.

For the Bachelor's and Master's degree programmes Information Systems

E 9. (ASIIN 1.3) It is recommended to put a stronger emphasis on economic foundations so that graduates can adapt to applying information systems for enterprises more effectively.

H Decision of the Accreditation Commission (07.12.2021)

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

The Accreditation Commission discusses the procedure and agrees with the changes suggested by the Technical Committees and with the revised requirements and recommendations.

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 Informatics	With requirements for one year	30.09.2027	–	--
Ba Information Systems	With requirements for one year	30.09.2027	–	--
Ma Informatics	With requirements for one year	30.09.2027	–	--
Ma Information Systems	With requirements for one year	30.09.2027	–	--

Requirements

For all degree programmes

- A 1. (ASIIN 1.1, 5.1) Module descriptions of the master programs must reflect that students are required to acquire research and development skills rather than fundamental research skills. This concerns in particular the modules “Thesis proposal” and “Thesis – Scientific Publication”.
- A 2. (ASIIN 1.4) ITS must not exclude students from admission on the grounds of colour-blindness.

- A 3. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.
- A 4. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.
- A 5. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students.

For the Bachelor's and Master's degree programmes Information Systems

- A 6. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the informatics study programmes.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to further strengthen the soft skills, particularly regarding critical thinking, communication and leadership, of the graduates.
- E 2. (ASIIN 1.3) It is recommended to strengthen the theoretical basis and the scientific foundations of the programs.
- E 3. (ASIIN 2.1) It is recommended to consider improving the structure and organization of the internship.
- E 4. (ASIIN 4.1) It is recommended to offer more financial and organizational support to the academic staff in terms of research activities.
- E 5. (ASIIN 6) It is recommended to use the results of internal quality assurance processes more systematically in order to identify points that need improvement.
- E 6. (ASIIN 6) It is recommended to broaden the students' involvement in the constant development of the programs; in particular, student representatives should be involved in the relevant decision-making bodies.

For the Bachelor's degree programmes

- E 7. (ASIIN 1.3) It should be evaluated in how far the general modules in the first two semesters (especially chemistry) are relevant for the competence profile of the programs.

For the Master's degree programmes

E 8. (ASIIN 2.1) It is recommended to group the electives into specializations in order to better support the students to select a meaningful study plan.

For the Bachelor's and Master's degree programmes Information Systems

E 9. (ASIIN 1.3) It is recommended to put a stronger emphasis on foundations in business administration and management so that graduates can adapt to applying information systems for enterprises more effectively.

I Fulfilment of Requirements (09.12.2022)

Analysis of the peers and the Technical Committees (01.12.2022)

Requirements

For all degree programmes

A 1. (ASIIN 1.1, 5.1) Module descriptions of the master programs must reflect that students are required to acquire research and development skills rather than fundamental research skills. This concerns in particular the modules "Thesis proposal" and "Thesis – Scientific Publication".

Initial Treatment	
Peers	not completely fulfilled Justification: The changes for the MIS programme are sufficient. For the MIP programme, the description of the module „Thesis – Final defense“ must be updated.
TC 04	not for all programmes fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

TC 07	not for all programmes fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
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- A 2. (ASIIN 1.4)) ITS must not exclude students from admission on the grounds of colour-blindness.

Initial Treatment	
Peers	fulfilled Justification: a „circular letter“ by the vice rector is presented; the examination orders are not updated as far as I can see, but I think we can be satisfied with the mentioned letter.
TC 04	not (completely) fulfilled Vote: unanimous Justification: A letter from the vice rector is not binding enough and therefore not sufficient proof. Must be included in the admission/examination regulations, for example.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

- A 3. (ASIIN 3) Establish official compensation measures for exams for students with disabilities.

Initial Treatment	
Peers	fulfilled Justification: Measures to support students with disabilities have been introduced.
TC 04	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

- A 4. (ASIIN 6) It has to be ensured that the course evaluation surveys are anonymous.

Initial Treatment	
Peers	fulfilled Justification: The course evaluations are now anonymous. Students can no longer be identified based on their student ID.
TC 04	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

- A 5. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students.

Initial Treatment	
Peers	not completely fulfilled Justification: ITS has not changed the number of credits (3) for the module „Graph Theory and Automata“. Also, the contents has not changed. Other examples are modules such as Data Structure (2. S, 3 SKS), Design and Analysis of Algorithms (4. S., 3SKS), Development and Analysis of Algorithms (6. S. nicht verpflichtend, 3 SKS), Graph Theory and Automata (6. S., 3 SKS). It remains unclear which measures have been taken to match credits and workload.
TC 04	not completely fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	not completely fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

For the Bachelor's and Master's degree programmes Information Systems

- A 6. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the informatics study programmes.

Initial Treatment	
Peers	Partly fulfilled

	Justification: The description for the MIS programme is acceptable. Evidence 13c cannot be accessed. Therefore this requirement cannot be fully assessed.
TC 04	Partly fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	Partly fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

Decision of the Accreditation Commission (09.12.2022)

The Accreditation Commission discusses the procedure and essentially follows the assessment of the peers and the expert committees. Regarding A2, the Accreditation Commission has received additional documents that dispel the doubts of Expert Committee 04 and therefore considers this requirement to be fulfilled.

Having taken into consideration the assessment of the expert panel and the relevant Technical Committees, the Accreditation Commission took the following decision:

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Informatics	Requirement 5 not fulfilled		Prolongation for 6 months
Ma Informatics	Requirement 1,5 not fulfilled		Prolongation for 6 months
Ba Information Systems	Requirement 5, 6 not fulfilled		Prolongation for 6 months
Ma Information Systems	Requirement 5 not fulfilled		Prolongation for 6 months

J Fulfilment of Requirements (23.06.2023)

Analysis of the peers and the Technical Committees (30.05.2023)

Requirements

For all degree programmes

A 1. (ASIIN 1.1, 5.1) Module descriptions of the master programs must reflect that students are required to acquire research and development skills rather than fundamental research skills. This concerns in particular the modules “Thesis proposal” and “Thesis – Scientific Publication”.

Secondary Treatment	
Peers	fulfilled Vote: unanimous Justification: The module descriptions have been changed to add development as a possible track.
TC 04	fulfilled Vote: unanimous Justification: The TC follows the assessment of the expert group.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the expert group.
Initial Treatment	
Peers	not completely fulfilled Justification: The changes for the MIS programme are sufficient. For the MIP programme, the description of the module „Thesis – Final defense“ must be updated.
TC 04	not for all programmes fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	not for all programmes fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

A 5. (ASIIN 2.2) Ensure that the credits awarded for the modules correspond with the actual workload of the students.

Secondary Treatment	
Peers	fulfilled Vote: unanimous Justification: The most critical modules have been redesigned and now look appropriate.
TC 04	fulfilled Vote: unanimous Justification: The TC follows the assessment of the expert group.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the expert group.
Initial Treatment	
Peers	not completely fulfilled Justification: ITS has not changed the number of credits (3) for the module „Graph Theory and Automata“. Also, the contents has not changed. Other examples are modules such as Data Structure (2. S, 3 SKS), Design and Analysis of Algorithms (4. S., 3SKS), Development and Analysis of Algorithms (6. S. nicht verpflichtend, 3 SKS), Graph Theory and Automata (6. S., 3 SKS). It remains unclear which measures have been taken to match credits and workload.
TC 04	not completely fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	not completely fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

For the Bachelor’s and Master’s degree programmes Information Systems

- A 6. (ASIIN 1.1) The learning outcomes and qualification profiles of the programmes are to be sharpened and formulated more precisely, also in differentiation to the informatics study programmes.

Secondary Treatment	
Peers	fulfilled Vote: unanimous Justification: The new documents describe the differences of UP and IS in sufficient details.
TC 04	fulfilled Vote: unanimous

	Justification: The TC follows the assessment of the expert group.
TC 07	fulfilled Vote: unanimous Justification: The TC follows the assessment of the expert group.
Initial Treatment	
Peers	Partly fulfilled Justification: The description for the MIS programme is acceptable. Evidence 13c cannot be accessed. Therefore this requirement cannot be fully assessed.
TC 04	Partly fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.
TC 07	Partly fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers.

Decision of the Accreditation Commission (23.06.2023)

The Accreditation Commission discusses the procedure and follows the assessment of the peers and the expert committees.

Having taken into consideration the assessment of the expert panel and the relevant Technical Committees, the Accreditation Commission took the following decision:

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Informatics	All requirements fulfilled		30.09.2027
Ma Informatics	All requirements fulfilled		30.09.2027
Ba Information Systems	All requirements fulfilled		30.09.2027
Ma Information Systems	All requirements fulfilled		30.09.2027

Appendix: Programme Learning Outcomes and Curricula

According to the website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Informatics:

“Attitudes:

1. Believing in the oneness of God and able to demonstrate religious attitude
2. Upholding the value of humanity in undertaking the task based on religion, morality and ethics
3. Contributing in improving the quality of community life, nation and state and the advance of civilization based on Pancasila
4. Playing a role as a proud citizen who loves his/her homeland , having a nationalism and responsibility to the country and nation
5. Appreciating the diversity of cultures, point of view, religion and belief as well as opinion or the original findings of others
6. Working together, having social sensitivity and caring for community and environment
7. Law abiding and disciplined in community and state life
8. Internalizing values, norms and academic ethics
9. Demonstrating attitude of responsibility on work in his/her field of expertise independently
10. Internalizing spirit of independence, struggle and entrepreneurship
11. Trying his/her best to achieve perfect results
12. Working together to be able to make the most of his/her potential

General skills:

1. Being able to apply logical, critical, systematic and innovative thinking in the context of development or implementation of science and technology that concerns and implements the value of humanities in accordance with their area of expertise
2. Being able to demonstrate independent performance, quality, and measurable
3. Being able to examine the implications of the development or implementation of the science of technology which concerns and implements the value of humanities in accordance with its expertise based on rules, procedures and scientific ethics in order to produce solutions, ideas, designs or art criticism, compile scientific descriptions of the study results in the form of thesis or final project report , and uploaded it in the college page

4. Arrange the scientific description of the results of the above study in the form of a thesis or final project report, and upload it on the college page
5. Being able to take decisions appropriately in the context of problem solving in the area of expertise based on the results of information and data analysis
6. Being able to maintain an expanded network with mentors, colleagues, colleagues both inside and outside the institution
7. Being able to take responsibility for the achievement of group work and supervise and evaluate the work completion assigned to the worker under his/her responsibility
8. Being able to conduct self-evaluation process to work group under his/her responsibility, and able to manage learning independently
9. Being able to document, store, secure and recover data to ensure validity and prevent plagiarism
10. Being able to develop themselves and compete in national and international level
11. Being able to implement sustainability principles and develop knowledge
12. Being able to implement information and communication technology (ICT) in the context of implementation of his/her work
13. Being able to apply entrepreneurship and understand technology-based entrepreneurship

Knowledge:

1. Mastering concept and principles of Intelligent System such as representation and reasoning techniques, searching technique, intelligent agent, data mining, machine learning, and development of intelligent application in various fields, and also mastering concept and principles of computation science such as manage information, multimedia data processing, and numerical analysis
2. Mastering concept and theory of architecture, system and network computer principles based on logic
3. Mastering theoretical concepts and fundamentals of net-centric computing and related-recent technologies, in the fields of distributed and mobile computing, multimedia computing, high performance computing along with information and network security
4. **Mastering the concepts and principles of:**
 - design and development of software using standardized and scientific methods of planning, requirement engineering, design, implementation, testing, and product releasing, to produce software products that meet various parameters of quality, i.e. technical, managerial, and efficient;
 - making simple programs in common programming languages as well as object-oriented programming languages, creating web applications and desktop applications, creating simple database to solve problems in the context of general software development.

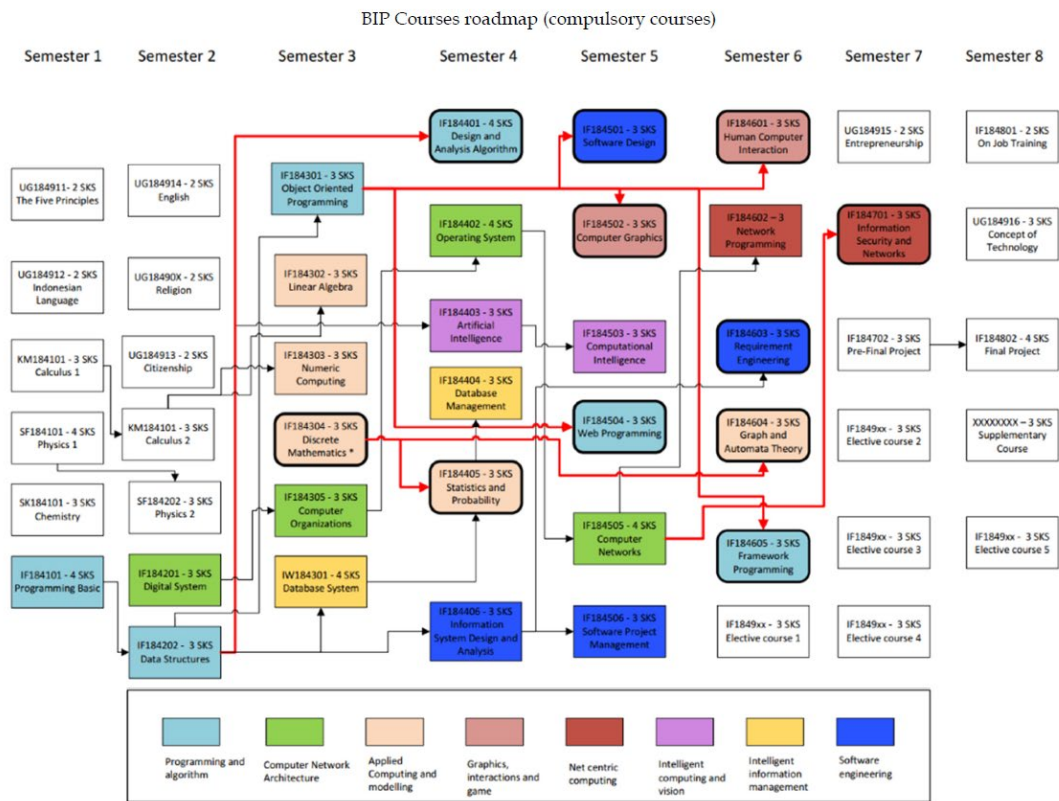
5. Mastering the concepts and principles of computer graphics including modeling, rendering, animation, and visualization, and also mastering the concepts and principles of human computer interaction.
6. Mastering principles and methods to solve computation problems by using calculus, matrixs, statistics, approximation, linear optimization, modelling and simulation
7. Mastering concepts and principles of collecting, processing and storing the information in various formats
8. Mastering principles of algorithm development and various programming language concepts

Specific skills:

1. Able to design and develop applications using principles of intelligent systems and computing science to produce intelligent applications in various fields
2. Able to implement computer architecture and principles of operating system tasks to design, implement and manage network system with high performance, safety, and efficient
3. Able to implement the concept of net-centric computing, parallel computing, distributed computing for analyzing and designing an algorithm which may be used to solve computation problem in various fields
4. Able to analyze, design and build software using software engineering process principles to produce software that meets both technical and managerial qualities
5. Able to develop application using computer graphics principles including modeling, rendering, animation, and visualization, implement human computer interaction principles, and evaluate the efficiency of the appropriate interface in the application developed.
6. Able to solve computation problems, and mathematical modelling through exact, stochastic, probabilistic, and numeric approaches effectively and efficiently
7. Capable of collecting, digitalizing, representing and transforming data into new useful information by using data modeling and storage in effective and efficient manners
8. Capable of designing and analyzing of algorithms to solve problems effectively and efficiently based on programming principles, and able to apply programming model in various programming language; and able to choose programming languages in producing appropriate applications”

The following **curriculum** is presented:

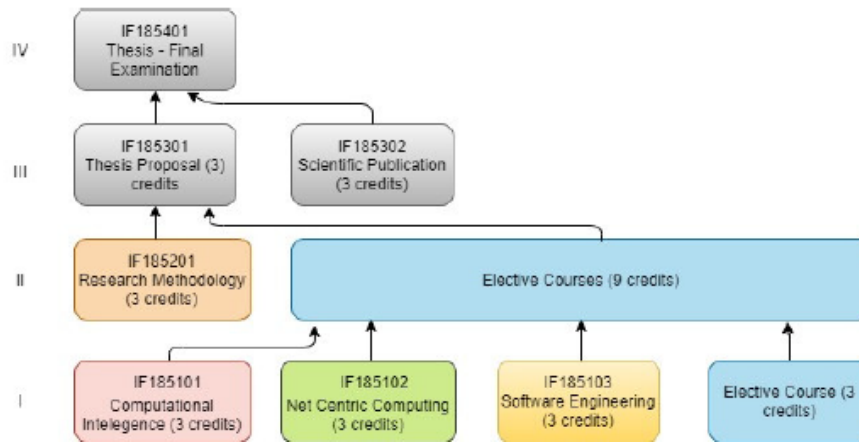
0 Appendix: Programme Learning Outcomes and Curricula



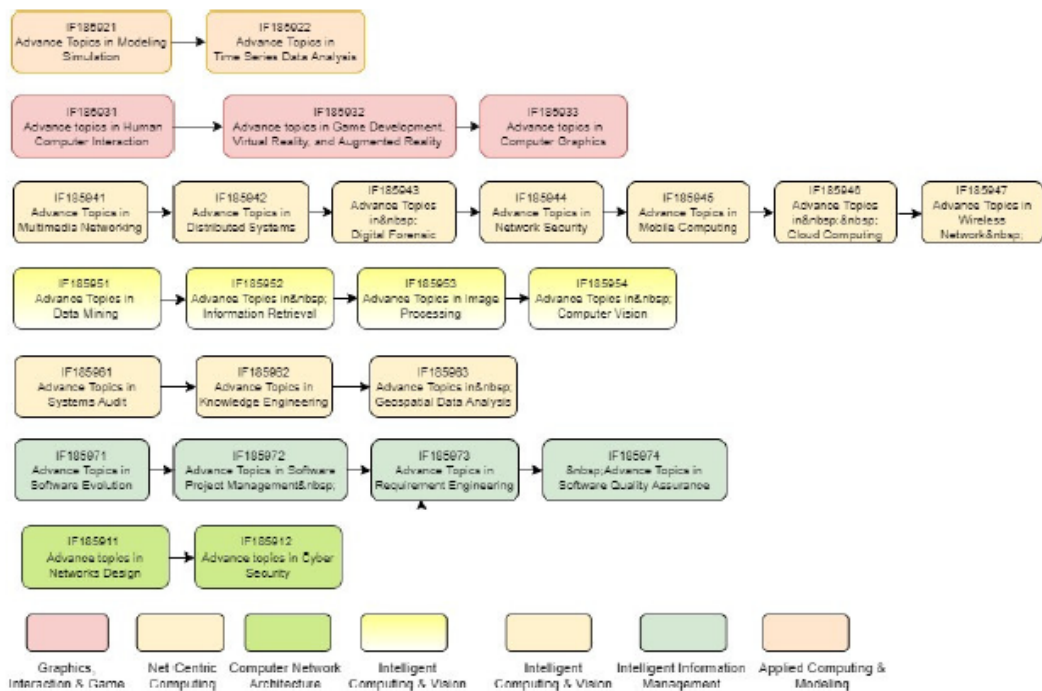
For the Master's programme Informatics, there are no **objectives** and **learning outcomes** (**intended qualifications profile**) publicly available.

The following **curriculum** is presented:

MIP Courses Roadmap (compulsory courses)



MIP Elective Courses



According to the website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor’s degree programme Information systems:







“Graduates are expected to be able to:

1. Use an IT solution and its alternatives that improve business performance & competitiveness
2. Plan an improvement of the quality of business & IT integration that deliver competitiveness to the organization
3. Use basic of logic & mathematics, statistics, physics, chemistry to solve various business problems
4. Demonstrate intrapersonal & interpersonal skills in business environment
5. Produce scientific papers & IT entrepreneurship that can solve actual problems
6. Recognize basic concept of managing IT organizations, processes & artifacts for business continuity
7. Recognize basic knowledge of business & IT
8. Demonstrate all their expertise in the nation & country with integrity & ethics
9. Demonstrate the spirit of entrepreneurship in accordance with his expertise in the latest times”

The following **curriculum** is presented:

0 Appendix: Programme Learning Outcomes and Curricula

INFORMATION SYSTEMS PROGRAM COURSES
CURRICULUM 2018

	     						
	Information Visualization	Cyber Security	Business Continuity Management	Combinatoric & Heuristic Optimization	Digital Business	Internship	
	3	3	3	3	3	3	
	Natural Language Processing	Digital Forensics	Organization Change Management	Data Mining	Model Driven DSS	Digital Brand Management	
	3	3	3	3	3	3	
elective courses	Web Technology	Internet of Things	IT Governance	Decision Support System	Customer Relationship Management	Digital Marketing	elective courses
	3	3	3	3	3	3	
	Database Technology	Mobile Technology	IT Risk & Quality Management	Forecasting Techniques	Supply Chain Management	Digital Creative	
	3	3	3	3	3	3	
Semester VIII	Elective Course 4	Elective Course 5	Final Project	Enrichment Course 1	Enrichment Course 2		Comprehensive capability assessment
16	3	3	4	3	3		
Semester VII	Elective Course 1	Elective Course 2	Elective Course 3	Pre Final Project	IT Evaluation & Audit	IT Professional Ethics	Explore the capabilities to optimize the IT solutions
18	3	3	3	2	4	3	
Semester VI	Business Analytics	Database Management	User Experience Design	Information Asset Protection	IT Investment Management	Digital Startup	
19	4	3	3	3	3	3	
Semester V	Operation Research	Business Intelligence	IT Service Management	Software Deployment	IT Strategic Planning	Technical presentation	
18	3	4	3	3	3	2	
Semester IV	Concept of Tech.	Computer Network Management & Design	Software Development	IT Project Management	Enterprise Systems		Train the ability to provide IT solutions
18	2	4	4	4	4		
Semester III	Statistics	Database Systems	Web Programming	IT Process & Management	Software Requirement Engineering	Business Process Management	
19	3	4	2	3	3	4	
Semester II	Civics Education	Religion	Mathematics I	Physics II	Algorithms & Programming	Business Functional Organization	English
18	2	2	3	3	3	3	2
Semester I	Pancasila	Mathematics I	Physics I	Chemistry I	Logic and Discret	IS Concepts	Bahasa Indonesia
18	2	3	4	3	2	2	2
total	Knowledge & Skill Support	IT Availability			Business Solution		Learning Strategy
144	sks	sks			sks		sks

solid IS Core Courses
 up-diagona ITS & Faculty Special Courses
 down-diagona National Courses

Courses with **RED** font are delivered by TPB / MKDU / other Programs at ITS

According to the website, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master’s degree programme Information systems:

Master of Information Systems educates the students to become an Information Technology Professional who is able to develop Information Systems scientific methods to solve various **practical** and **research** problems in the 5 (five) Graduate Profiles:

Graduate Profiles	Description
Business Analyst (BA)	Analyzes information systems for improving business performance. Identifies areas where information system changes are needed to support business plans and monitors the impact in terms of change management. Contributes to the general functional requirements of the business organization in the area of ICT solutions. Analyzes business needs and translates them into ICT solutions.
Systems Analyst (SA)	Analyzes requirements and specifies software and systems. Ensures the technical design and contributes to implementation of new software and/or enhancements
IS Project Manager (ISPM)	Manages Information System projects to achieve optimal performance conforming to original specifications. Defines, implements, and manages projects from conception to final delivery. Responsible for achieving optimal results; conforming to standards for quality, safety; and sustainability and complying with defined scope, performance, costs, and schedule
Business Information Manager (BIM)	Proposes, plans, and manages functional and technical evolutions of the information system in the relevant business domain. Manages and implements updates to existing applications and maintenance activities guided by the needs, costs, and plans agreed with internal users. Ensures quality of service and internal user satisfaction
Enterprise Architect (EA)	Designs and maintains the enterprise architecture. Balances technological opportunities with business (process) requirements. Maintains a holistic view of the organization's strategy, processes, information, and ICT assets. Links the business mission, strategy, and processes to the IT strategy
ICT Consultant (ICTC)	Supports understanding of how new ICT technologies add value to a business. Ensures technological watch to inform stakeholders of emergent technologies. Anticipates and brings to maturity ICT projects by the introduction of

appropriate technology. Communicates the value of new technologies to the business. Contributes to project definitions.

The following **curriculum** is presented:

Courses and Curriculum of MISP

No	Subject name	Credit(s)
Semester 1		
1	Data and Information Management	3
2	Information Systems Strategic Management	3
3	Information Systems and Technology Infrastructure	3
4	Systems Development and Implementation	3
Semester 2		
1	Research Method	2
2	Information Systems Management and Operation	3
3	<i>Elective course 1</i>	3
Semester 3		
1	<i>Elective course 2</i>	3
2	<i>Elective course 3</i>	3
3	Seminar / Thesis Proposal	2
Semester 4		
1	Thesis	8

Elective Courses of MISP

No	Name of Elective Course
1	Topics in the e-Government and Smart City Management
2	Topic in Information Systems Audit and Governance
3	Topics in Information Systems and Technology Investment and Productivity
4	Topics in Database Technology
5	Topics in Data Integration
6	Topics in Semantic Web
7	Topics in Data Mining and Business Analytics
8	Topics in Optimization and Management Science
9	Topics in Decision Support Systems
10	Topics in Modelling and Simulation Systems
11	Topics in System Dynamics and Its Application in Various Fields
12	Topics in Enterprise Systems
13	Topics in Information Technology Architecture for Corporate
14	Topics in System and Network Security
15	Topics in Embedded System Development