AQAS

AGENTUR FÜR
QUALITÄTSSICHERUNG DURCH
AKKREDITIERUNG VON
STUDIENGÄNGEN E.V.

FINAL REPORT

UNIVERSITAS PENDIDIKAN GANESHA

CLUSTER COMPUTER SCIENCE & INFORMATICS EDUCATION

COMPUTER SCIENCE (BACHELOR OF COMPUTER SCIENCE)

INFORMATION SYSTEM (BACHELOR OF COMPUTER SCIENCE)

INFORMATICS EDUCATION (BACHELOR OF EDUCATION)

COMPUTER SCIENCE (MASTER OF COMPUTER SCIENCE)

December 2022

Content

DECISION OF THE AQAS STANDING COMMISSION

ON THE STUDY PROGRAMMES

- **COMPUTER SCIENCE (BACHELOR OF COMPUTER SCIENCE)**
- **INFORMATION SYSTEM (BACHELOR OF COMPUTER SCIENCE)**
- **INFORMATICS EDUCATION (BACHELOR OF EDUCATION)**
- **COMPUTER SCIENCE (MASTER OF COMPUTER SCIENCE)**

OFFERED BY UNIVERSITAS PENDIDIKAN GANESHA, SINGARAJA, INDONESIA

Based on the report of the expert panel, the comments by the university and the discussions of the AQAS Standing Commission in its 15th meeting on 5 December 2022, the AQAS Standing Commission decides:

1. The study programmes "**Computer Science**" (Bachelor of Computer Science), "**Information System**" (Bachelor of Computer Science), "**Informatics Education**" (Bachelor of Education) and "**Computer Science**" (Master of Computer Science) offered by **Universitas Pendidikan Ganesha** (**Indonesia**) are accredited according to the AQAS Criteria for Programme Accreditation (Bachelor/Master).

   The accreditations are conditional.

   The study programmes essentially comply with the requirements defined by the criteria and thus the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) and the European Qualifications Framework (EQF) in their current version. The required adjustments can be implemented within a time period of twelve months.

2. The conditions have to be fulfilled. The fulfilment of the conditions has to be documented and reported to AQAS no later than **31 December 2023**. The confirmation of the conditions might include a physical site visit within the time period of twelve months.

3. The accreditation is given for the period of **six years** and is valid until **31 December 2028**.

Conditions:

For all study programmes:

1. The course descriptions of all programmes must be improved: the level of details must be improved and be made consistent between different courses in the same programme and between the different programmes.

For the study programmes "Computer Science" (Bachelor & Master) and "Informatics Education" (Bachelor):

2. The formulation of the Programme Learning Outcomes must be improved to clearly depict the level of the qualification. Special attention must be given to using active verbs; by doing so, the different levels of the taxonomy according to Bloom should be taken into account.

For the study programmes “Computer Science” (Bachelor) and “Informatics Education” (Bachelor):

3. A Theory of Computation (i.e., automata theory, complexity, and formal languages) course must be included in the curricula.

For the study programme “Information System” (Bachelor):

4. Basic mathematics (such as analysis, linear algebra, discreet mathematics, etc.) must be included in the curriculum and depicted clearly in the corresponding course descriptions.

The following **recommendations** are given for further improvement of the programmes:

For all study programmes:

1. When reviewing the course descriptions, special attention should be given to providing current references (literature). In order to make the progression within the programme clearer, the necessary prerequisites for each course should be indicated in each course description.
2. The full course descriptions should be made available in English and in a single place on the university website for both prospective and current students.
3. The Diploma Supplement provided by the university should include information on the specific concentration chosen by the students in each programme. It should also include transparent information on the workload (hours) of the thesis.
4. In order to facilitate international student mobility and to support students wishing to continue their studies abroad, the university should provide transparent information for non-Indonesian interlocutors on the workload in all the programmes (e.g., a complete and coherent credit conversion table). The university should generally develop its international partnerships.
5. UNDIKSHA should provide each study programme team with study programme specific information in the framework of the tracer study and other data gathering exercises. The information should be made available more transparently.
6. The university should strive to diversify its assessment methods and include additional inclusive methods to evaluate the attainment of learning outcomes by students in different stages (e.g., programme benchmarking with international universities and an entrance survey).
7. Lecturers should include current research into their teaching more.
8. The faculty should engage more with external collaborations (e.g., established research labs or industry) in students’ learning and research related to advanced topics (e.g., robotics).
9. UNDIKSHA should further develop its teaching staff (structured development programme for PhD holders) and assign senior staff (at least one full professor) to each programme.
10. UNDIKSHA should implement a structured development programme for teaching staff, leading them to a PhD, e.g., in the framework of the university’s 2030 “Zero Master” programme.
11. The university should expand its e-journal/e-library resources.
12. The faculty should provide more specialised and appropriate software for Computer Science (e.g., for modelling).

For the study programme “Computer Science” (Bachelor):

13. The curriculum should be updated:
    a. Courses on Software Engineering should be provided prior to courses on Human-Computer Interaction.
    b. The course on Introduction to Information Technology should be dropped.
    c. A Software Modelling course should be included.
    d. The curriculum should deal more explicitly with the area of computer security and address topics such as UI/UX and design thinking.

For the study programme “Information System” (Bachelor):

14. The university should consider extending the credits for the Bachelor’s thesis.

15. The curriculum should be updated:
    a. Basic courses on business and management should be offered earlier in the curriculum.
    b. Emerging topics like digital innovation or cyber-physical systems should be considered as potential addition in the next curriculum review.

For the study programme “Informatics Education” (Bachelor):

16. The curriculum should deal in more detail with topic specific didactics, teaching methods and the theory of cognitive processes regarding programming and informatics systems.

For the study programme “Computer Science” (Master):

17. Different forms of examination (such as oral exams) should be considered. The deadlines of the different examinations should be checked against each other.

With regard to the reasons for this decision the Standing Commission refers to the attached assessment report.

EXPERTS' REPORT

ON THE STUDY PROGRAMMES

- **COMPUTER SCIENCE (BACHELOR OF COMPUTER SCIENCE)**
- **INFORMATION SYSTEM (BACHELOR OF COMPUTER SCIENCE)**
- **INFORMATICS EDUCATION (BACHELOR OF EDUCATION)**
- **COMPUTER SCIENCE (MASTER OF COMPUTER SCIENCE)**

OFFERED BY UNIVERSITAS PENDIDIKAN GANESHA, SINGARAJA, INDONESIA

Online visit to the university: 9-12-14-15 September 2022

Panel of experts:

Assoc. Prof. Ts. Dr. Novia Indriaty Admodisastro	Universiti Putra Malaysia, Faculty of Computer Science and Information Technology, Department Of Software Engineering And Information System (Malaysia)
Prof. Dr. rer. pol. Jan M. Pawlowski	Hochschule Ruhr West University of Applied Sciences, Institute of Computer Science (Germany)
Prof. Dr. Michael Brinkmeier	Osnabrück University, Institute of Computer Science (Germany)
Dr. Markus Toschläger	Managing Director, myconsult GmbH (Salzkotten, Germany) (labour market representative)
Felix Kettenbeil	Student of the University of Göttingen (Germany) (student representative)

Coordinator:

Alexandre Wipf, Maria Rentmeister	AQAS, Cologne, Germany

I. Preamble

AQAS – Agency for Quality Assurance through Accreditation of Study Programmes – is an independent non-profit organisation supported by more than 90 universities, universities of applied sciences and academic associations. Since 2002, the agency has been recognised by the German Accreditation Council (GAC). It is, therefore, a notified body for the accreditation of higher education institutions and programmes in Germany.

AQAS is a full member of ENQA and also listed in the European Quality Assurance Register for Higher Education (EQAR) which confirms that our procedures comply with the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), on which all Bologna countries agreed as a basis for internal and external quality assurance.

AQAS is an institution founded by and working for higher education institutions and academic associations. The agency is devoted to quality assurance and quality development of academic studies and higher education institutions' teaching. In line with AQAS' mission statement, the official bodies in Germany and Europe (GAC and EQAR) approved that the activities of AQAS in accreditation are neither limited to specific academic disciplines or degrees nor a particular type of higher education institution.

II. Accreditation procedure

This report results from the external review of the study programmes "Computer Science" (Bachelor of Computer Science), "Information System" (Bachelor of Computer Science), "Informatics Education" (Bachelor of Education) and "Computer Science" (Master of Computer Science) offered by Universitas Pendidikan Ganesha.

1. Criteria

Each programme is assessed against a set of criteria for accreditation developed by AQAS: the AQAS Criteria for Programme Accreditation (Bachelor/Master). The criteria are based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) 2015. To facilitate the review each criterion features a set of indicators that can be used to demonstrate the fulfilment of the criteria. However, if single indicators are not fulfilled this does not automatically mean that a criterion is not met. The indicators need to be discussed in the context of each programme since not all indicators necessarily can be applied to every programme.

2. Approach and methodology

Initialisation

The university mandated AQAS to perform the accreditation procedure in April 2021. The university produced a Self-Evaluation Report (SER). In January 2022, the institution handed in a draft of the SER together with the relevant documentation on the programmes and an appendix. The appendix included e.g.:

- an overview over statistical data of the student body (e.g. number of applications, beginners, students, graduates, student dropouts),
- the CVs of the teaching staff/supervisors,
- information on student services,
- core information on the main library,
- as well as academic regulations.

AQAS checked the SER regarding completeness, comprehensibility, and transparency. The accreditation procedure was officially initialised by a decision of the AQAS Standing Commission on 21 February 2022. The final version of the SER was handed in April 2022.

Nomination of the expert panel

The composition of the panel of experts follows the stakeholder principle. Consequently, representatives from the respective disciplines, the labour market, and students are involved. Furthermore, AQAS follows the principles for the selection of experts defined by the European Consortium for Accreditation (ECA). The Standing Commission nominated the aforementioned expert panel in July 2022. AQAS informed the university about the members of the expert panel and the university did not raise any concerns against the composition of the panel.

Preparation of the site visit

Prior to the site visit, the experts reviewed the SER and submitted a short preliminary statement including open questions and potential needs for additional information. AQAS forwarded these preliminary statements to the university and to all panel members in order to increase transparency in the process and the upcoming discussions during the site visit.

Site visit

After a review of the SER, a digital site visit to the university took place on 9-12-14-15 September. Online, the experts interviewed different stakeholders, e.g. the management of the higher education institution, the programme management, teaching and other staff, as well as students and graduates, in separate discussion rounds and consulted additional documentation as well as student work. The visit concluded by the presentation of the preliminary findings of the group of experts to the university's representatives.

Reporting

After the site visit had taken place, the expert group drafted the following report, assessing the fulfilment of the AQAS Criteria. The report included a recommendation to the AQAS Standing Commission. The report was sent to the university for comments.

Decision

The report, together with the comments of the university, forms the basis for the AQAS Standing Commission to take a decision regarding the accreditation of the programmes. Based on these two documents, the AQAS Standing Commission took its decision on the accreditation on 5 December 2022. AQAS forwarded the decision to the university. The university had the right to appeal against the decision or any of the imposed conditions.

In January 2023, AQAS published the report and the result of the accreditation as well as the names of the panel of experts.

III. General information on the university

Universitas Pendidikan Ganesha (UNDIKSHA) is a state university located at Singaraja City in Bali Province, Indonesia. The university originated from a structure offering Indonesian language teaching courses in 1955 and is known since 2006 as Universitas Pendidikan Ganesha. The university's mission is to "Become a leading university based on the Tri Hita Karana philosophy in Asia by 2045". Tri Hita Karana refers to the three causes to prosperity as the philosophy of life in creating harmony with the creator, the universe, and fellow human beings. The university's missions are 1) to conduct dignified education and teaching in producing competitive, collaborative, and good character human resources, 2) to conduct competitive, collaborative, and innovative research for the science and technology development and application, and 3) to conduct competitive, collaborative, accommodative, and innovative community service. The university has developed a Strategic Plan for 2020-2024 and there are work plans for each study programme to reach the university-wide set goals. Nationally, Indonesia refers to the three missions of higher education as the *Tri Dharma* of higher education: education, research and community service interlaced.

UNDIKSHA has eight faculties (Science Education, Law and Social Sciences, Languages and Arts, Mathematics and Natural Sciences Education, Engineering and Vocational, Sports and Health, Economics, Medicine) and one Postgraduate Programme. It offers a total of 65 study programmes, including 11 Diploma III programmes, 37 Bachelor's programmes, 14 Master's programmes and 3 doctoral programmes. At the time of submission of the self-evaluation report there were 12,750 enrolled students and 480 lecturers at UNDIKSHA.

The three Bachelor's programmes under review are offered at the Faculty of Engineering and Vocational, specifically by the Informatics Engineering Department. There is a total of 1,605 students at the faculty in nine study programmes. The Master's programme is offered by the Postgraduate Programme of UNDIKSHA a total of 956 postgraduate students are enrolled.

IV. Assessment of the study programmes

1. Quality of the curriculum

Bachelor's/Master's degree

The intended learning outcomes of the programme are defined and available in published form. They reflect both academic and labour-market requirements and are up-to-date with relation to the relevant field. The design of the programme supports achievement of the intended learning outcomes.

The academic level of graduates corresponds to the requirements of the appropriate level of the European Qualifications Framework.

The curriculum's design is readily available and transparently formulated.

[ESG 1.2]

Overarching information

UNDIKSHA uses the national credit system for higher education, Semester Credit Unit or SKS. 1 SKS corresponds to 170 study minutes per week (for lectures: 50 minutes of face-to-face meetings, 60 minutes of structured activities and 60 minutes of independent learning; for seminars: 100 minutes of face-to-face meetings and 70 minutes of independent learning; for practicum courses: 170 minutes of laboratory activities). For conversion purposes the university allocates 1,5 ECTS to 1 SKS.

The programme leaders state that the Bachelor's programmes correspond to level 6 of the Indonesian National Qualification Framework (KKNI) and that the Master's programme corresponds to level 8. Following national

guidelines the university adopts the Outcome-Based Education (OBE) model for its programmes. Regarding the development of the curricula UNDIKSHA states that the programme leaders conducted a SWOT analysis, gathered feedback from industry representatives, government agencies, alumni, cooperating companies, staff and university members through a series of workshops. For each study programme, programme leaders first define graduate profiles. These profiles are then used to develop Programme Educational Objectives (PEO) followed by Programme Learning Outcomes (PLO) and corresponding Course Learning Outcomes (CLO). The learning outcomes are divided in the categories attitude, knowledge, general skills, and special skills.

The university indicates that Bachelor's students can take courses outside of their study programmes in their sixth and/or seventh semester using the national Freedom to Learn/Independent Campus (MBKM) scheme.

Computer Science (Bachelor)

Description

The Bachelor's programme "Computer Science" covers a total of 145 SKS over 8 semesters. Enrolment is set at 60 students per year. Upon graduation students are awarded a "Bachelor of Computer Science" degree or S.Kom.

The graduates of the programme should find employment as software engineers, professionals in data science and intelligent systems or professionals in information technology's infrastructure and security.

The programme leaders indicate that they developed the curriculum considering the Academic Papers of Informatics and Computer Sciences published by the Association for Higher Education in Informatics and Computers (APTIKOM) and the IEEE/ACM Computer Science Curricula. They have defined 9 programme learning outcomes. The students should thus be able, among others, to demonstrate scientific, educational, and religious attitudes and behaviours that improve the quality of life in society, nation, and state based on academic norms, ethics, and Tri Hita Karana values. They should also master the theoretical concepts of computer science in general, such as mathematics, algorithms, programming, and databases as well as the theoretical concepts of software engineering, data science and intelligent systems, and cybersecurity and infrastructure. The graduates should be able to integrate learning and innovation skills, mastery of technology and information, career development, and life skills to become lifelong learners. They should finally be able to perform a needs analysis, as well as design, implement and evaluate enterprise software.

The curriculum is composed of 5 general compulsory courses (10 credits, e.g. English, Pancasila) as well as the educational science course Tri Hita Karana (2 credits), 29 core study courses (86 credits, e.g. Algorithms and Programming, Introduction to Information Technology, Distributed System, Software engineering, Research Methodology – and the final thesis worth 6 credits), 10 supporting science and technology courses (26 credits, e.g. Community Service Program, English in Information Technology), and 7 scientific field of study courses (21 credits). Within the scientific field of study courses students choose one of three concentrations (Software Engineering, Data Science & Intelligent Systems, Infrastructure and Network Security) of 7 courses each.

Experts' evaluation

The Bachelor's curriculum of Computer Science consists of 145 SKS with three concentrations i.e., Software Engineering, Data Science & Intelligent Systems, and Infrastructure and Network Security. This is aligned with graduate profiles intended in the study programme i.e., software engineer, professional in data science and intelligent systems, and professional in IT infrastructure and security.

The curriculum is divided into five categories of courses. First, general courses are mandatory and cover general topics like languages and government-required courses (e.g., Pancasila, English, Religion). Second, the

Educational Science category i.e., the Tri Hita Karana course is also mandatory. Third, Core Study courses are mandatory fundamental courses in Computer Science (e.g., algorithms, programming, operating system, and database). The fourth field of study allows the students to take a set of elective courses from one of the three concentrations in the later stage of their studies. Finally, Supporting Science & Technology courses are supporting courses from outside of the study programme that include technopreneur, professional ethics, and other interdisciplinary courses to enrich the programme. The curriculum then also includes fieldwork and the final thesis.

Overall, the Bachelor's curriculum of Computer Science is well designed. The curriculum provides fundamental courses for the main fields of Computer Science and essential basic mathematics courses. It also describes concentration elective courses for related focus areas and the different graduate profiles. The curriculum structure indicates different means of evaluations (such as written exams, lab practicals, presentations, participation, and assignments) to assess the students' progression and their attainment of the learning outcomes (i.e., knowledge, attitude, general skills, and special skills). The curriculum is overall well aligned to the national qualifications' framework KKNI, the APTIKOM (Association for Higher Education in Informatics and Computers) recommendations, and the international standard IEEE/ACM Computer Science Curricula. The programme is well aligned with the corresponding EQF level 6. While the overall curriculum can be seen positively after the initial analysis and the site visit, the experts also see areas for further improvement.

One key issue is the programme/module/course offering in terms of descriptions, competencies, and placement. Modules/courses are described in a structured template but lack details in content and learning outcome descriptions to ensure a smooth credit transfer process internationally. The experts consider that the programme learning outcomes (PLO) need to be revised describing the programme outcomes with details that are observable (and when appropriate measurable) to ensure each set of outcomes is coherent with the module/course learning outcomes (**Finding 1**). For instance, the usage of 'mastering' to describe the PLOs is deemed unsuitable and an unclear depiction of the qualification level (Bachelor – for the Master's programme, see underneath). Bloom's taxonomy could be used to classify the learning or cognition levels – a mapping table of PLO, CLO and graduate profiles might also be helpful.

At the same time the learning outcomes and contents in the module/course descriptions must be improved and provide a more detailed level with a consistent written format to ensure easier credit transfer, e.g., for exchange students, transfer programmes. Hence, the experts consider that the module learning outcomes must be written in observable terms and be related to the specific topic at hand, e.g., CLO1 in the course KOMS120105 Human Computer Interaction is deemed unsuitable ("Students can explain the basic concepts of computer science") (**Finding 2**). In addition, contents could be grouped more clearly into topics and subtopics. References in module descriptions should be updated accordingly from reliable and more accessible sources to ensure that the students have the latest points of reference. Furthermore, the pre-requisite module/course should be described in the curriculum to ensure a transparent learning sequence and progression (**Finding 3**).

Another issue relates to theoretical computer science competency – an important topic in Computer Science – which appears to be missing from the curriculum. The university explained that some of the topics are included in other courses such as discrete mathematics or algorithm analysis. A dedicated module/course covering automata theory and formal language topics is not offered. The experts think it necessary to include a Theory of Computation (i.e., automata theory and formal languages) module/course in the curriculum. The experts consider that the module is necessary to provide fundamental understanding to Computer Science students in dealing with efficiency and complexity algorithms, as well as the related fields e.g., Cryptography, Security (**Finding 4**). The module could be offered in the second year with the Discrete Structure module as a prerequisite.

The modules/courses organisation for some modules is found to be unsuitable for the students' learning progression (i.e., Software engineering (SE) & Human-Computer Interaction (HCI)) since the SE course provides a software development overview and the HCI course focuses on human factors in designing and evaluating usable software. Another issue raised by the expert panel was the contents covered in certain modules/courses i.e., OOAD (object-oriented analysis and design), SE, and HCI. For SE and OOAD several topics in content descriptions were found to be repeated, and the HCI-SE courses sequence raises questions as to the possibility for students to learn the subjects as mentioned above. The university mentioned that the SE module discusses different software development methodologies and OOAD discusses analysis and design using the OO approach. In terms of the HCI course, which is taught earlier than the SE module, the lecture covers topics including usability testing, and heuristics and the lecturers found that their students have no problem following the course. Yet, the experts recommend to re-organise the placement of KOMS120406 Software Engineering (SE) and KOMS120105 Human-Computer Interaction (HCI) (**Finding 5a**). The experts consider that teaching SE to the students before HCI is beneficial to provide initial overall concepts in software development of high-quality software that includes development life cycle, stakeholders (incl. end-users), and methodologies. Afterwards, students could delve further into human factors, usability, and UI design as specific parts of software development. Additionally, the experts recommend deleting KOMS120104 Introduction to Information Technology from the curriculum. The KOMS120104 module description indicates contents attainable in other modules/courses including networking, operating system, web technology, database, and software engineering (**Finding 5b**). The module credit could be replaced with the Theory of Computation module (see above).

In addition, it is recommended to replace KOMS120408 Object-Oriented Analysis and Design (OOAD) with a Software Modelling module. The Software Modelling module could cover broader modelling topics for software systems from the analysis, design, and architecture using various methods (**Finding 5c**). The KOMS120406 Software Engineering (SE) contents descriptions show OOAD UML modelling discussion is already partly covered.

Further, the experts recommend the department includes, or explicitly dictates, the topic of Computer Security in the curriculum or modules/courses. Computer Security has become crucial in recent years and thus should be dealt in all concentrations. Also, emerging topics like UI/UX and design thinking should be considered in the next version of the curriculum (**Finding 5d**).

During the site visit, the experts discussed extensively the number of teaching staff and academic seniority to support the Computer Science programme – the corresponding recommendations are discussed in Chapter 5.

Conclusion

The criterion is partially fulfilled.

Information System (Bachelor)

Description

The Bachelor's programme "Information System" covers a total of 146 SKS over 8 semesters. Enrolment is set at 70 students per year. Upon graduation students are awarded a "Bachelor of Computer Science" degree or S.Kom.

Thematically, the study programme covers the field of informatics, organisation, and management. UNDIKSHA states that the graduates should find employment as programmers, computer engineers, web developers, IT planners, software engineers, project managers, data analysts, database administrators or in network security.

The main three graduate profiles are Information System Developer, Information System Consultant, Database Expert.

The programme leaders indicate that they considered the recommendations by the Association of Higher Education Informatics and Computers (APTIKOM) and the results of a graduate profile survey by the Association for Information Systems Indonesia (AISINDO) when developing the curriculum. For the Bachelor's programme "Information System" there are 11 programme learning outcomes. The students should be able to perform logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise. They should also be able to apply the basic concepts of logic, discrete structures, statistics, and various programming language models to solve various computational problems. Further, the graduates should be able to apply project management concepts in developing information systems and apply information system management concepts that are able to support organisational and enterprise decision-making. They should be able to analyse the quality of information systems, information technology investment techniques, IT governance, control, and auditing in line with organisational strategy. Finally, they should also be able to apply information technology, IS/IT architectural concepts, IS/IT master plan concepts, IS/IT service management in business and organisations by following future trends and being environmentally friendly.

The curriculum is composed of 5 general compulsory courses (10 credits, e.g. Civic Education, Indonesian) as well as the educational science course Tri Hita Karana (2 credits), 10 supporting science and technology courses (26 credits, e.g. English for Academic Scientific Writing, IS Research Methods), 42 scientific field of study courses (80 credits, e.g. IS Testing and Implementation, Ethical Hacking, Decision Support System, Database Design, Computer network), as well as a compulsory Non-Educational Community Service (4 credits), a compulsory internship (14 credits), and the final thesis (6 credits). Within the scientific field of study courses students can choose one of three concentrations (Information Systems Management, Business Intelligence and Engineering, Cyber Security) worth a total of 14 credits.

Experts' evaluation

The curriculum of Information Systems (IS) on the Bachelor level consists of 146 SKS covering general, science and management courses. The study programme focuses on three graduate profiles: IS Developer, IS Consultant, and Database Expert.

The curriculum is divided into three categories of courses. General courses are mandatory and cover topics like languages and government-required courses (e.g. Pancasila). Field of study courses focus on the basic fields of the Information System domain (e.g. database design, algorithms, business intelligence, programming). These courses are very well suited for the three graduate profiles. Furthermore, interdisciplinary courses enrich the programme (e.g. IS research methods, leadership, e-commerce). In the later stages of the programme, students can choose elective courses based on their specialisation. The curriculum then also includes field work and the final thesis.

Overall, the curriculum in Information Systems is well designed. The curriculum provides basic courses for the main fields of Information Systems. It also describes specialised elective courses for all focus areas and graduate profiles. It describes the graduate profiles and learning outcomes with sufficient details. The curriculum is overall well aligned to the international standard of the Association for Information Systems (AIS, 2020). The programme is well aligned to the corresponding EQF level 6. While the overall curriculum can be seen positively after the initial analysis and the site visit, the experts see areas for further improvement.

One key issue are the module descriptions. Courses (learning outcomes, contents) are described on a very superficial level. This can be a problem when transferring courses, e.g. for student mobility. Therefore, the experts believe that the module descriptions must be revised, describing the learning outcomes and contents

on a more detailed level to ensure a smooth transfer, e.g. for exchange students (**Finding 2**). The courses should provide a list of the contents and topics (not only a synopsis), as it is being done in the descriptions of the computer science courses in the Bachelor's Computer Science (notwithstanding the required changes there, see above).

Another topic discussed during the site visit was related to the workload of the study programme. One focus was the low workload for the bachelor thesis (6 credits nationally; corresponding to 9 ECTS according to UNDIKSHA's conversion table) which differs from most European theses (12 ECTS in Germany). However, here the workload is calculated in a different way. While the workload (hours) is appropriate, the transfer of credits (numbers) for exchange students might be problematic. To ease the transfer of credits for students, the university should consider extending the credits for the Bachelor's thesis (**Finding 6**). This might also be realised by connecting the course on IS research methods as a prerequisite for the thesis (i.e. preparing a research proposal for the thesis).

Furthermore, several suggestions regarding basic courses were discussed during the site visit. As a first issue, it was clarified that basic courses in business or economics can be taken as part of three interdisciplinary courses. The panel also discussed the lack of basic courses in mathematics (statistics and logic are well covered). The university mentioned that students can take mathematics also in interdisciplinary courses in the fifth semester. Still, the experts believe that at least one course on basic mathematical competencies (analysis, linear algebra, discreet mathematics, …) must be included in the first year of the study programme. The experts consider this necessary as these competencies are needed in many subjects (e.g. algorithms, data analysis, security) for a clear understanding of the field (**Finding 7**). To include this in the first semester, one or more courses from the basic and field course level need to be shifted to later semesters. At the same time, the experts recommend including basic courses on business and management already earlier in the study programme (**Finding 8a**). One or two courses for example on finances / accounting, supply chain management or general management could be included in an early stage. It would also be an option to include this as a mandatory part of the interdisciplinary courses.

One further issue was the discussion on the level of seniority of the teaching staff. There is no teaching staff with a higher level than assistant professor. The university representatives explained that the programme is rather new, and the academic staff is developing their skills and qualifications towards associate / full professor level. The experts however recommend assigning a senior level researcher to lead or at least consult with the study programme. This would be helpful to guide research, teaching, and programme development (see Chapter 5, **Finding 16**).

Another issue was the relation of research and teaching. It was explained that all lecturers are actively participating in research activities. Also, certain courses (e.g. IS research methods) focus on research competencies. When further developing the curriculum, the university should carefully analyse current trends in the IS domain. Emerging topics like digital innovation or cyber-physical systems should be included in the next version of the curriculum (**Finding 8b**). There should also be a clear procedure – specific to the programme – on how the research field as well as the job market is monitored and how observations will be included in new curricula. There should be a clear strategy on how to connect the departments' research activities and teaching. One example would be the systematic involvement of students in research activities. Furthermore, research-based teaching and learning methods could be used throughout the later stages of the study programme (see Chapter 3, **Finding 13**).

Conclusion

The criterion is partially fulfilled.

Informatics Education (Bachelor)

Description

The Bachelor's programme "Informatics Education" covers a total of 147 SKS over 8 semesters. Enrolment is set at 100 students per year. Upon graduation students are awarded a "Bachelor of Computer Science" degree or S.Kom.

The main aim of the programme is to train prospective computer and informatics engineering educators. The programme leaders state that they considered the Academic Papers of Informatics and Computer Sciences published by the Association for Higher Education in Informatics and Computers (APTIKOM) as well as the IEEE/ACM Computer Science Curricula when developing the study programme. There are 9 programme learning outcomes. Graduates should, among others, master the theoretical concepts of software engineering, data science and intelligent systems, and cybersecurity and infrastructure as well as master the operational concepts of methodologies in software development, data science, and intelligent systems, as well as infrastructure and cybersecurity in solving contextual problems that are beneficial to society. Students should be able to integrate learning and innovation skills, mastery of technology and information, career development, and life skills to become lifelong learners. They should also be able to extract information from various data sources, design and implement creative technology-based systems and products for automation and effective decision-making.

The curriculum is composed of 5 general compulsory courses (10 credits, e.g. Religious Education, English Language) as well as the educational science course Tri Hita Karana (2 credits) and the vocational education course (2 credits), 12 supporting science and technology courses (34 credits, e.g. Entrepreneurship, Basics of 2D Animation, Learning Multimedia), 7 education science courses (14 credits, e.g. Microteaching, Learning Evaluation and Assessment) and 31 field of study courses (85 credits, e.g. Software Engineering, Basic of Computer System, Operating System, Artificial Intelligence – including 3 electives, 2 internships of 14 credits each and the final thesis worth 6 credits). Elective courses within the field of study courses are grouped in the specialisations Computer Engineering and Networking, Software Engineering, Multimedia, and Intelligent System, each worth a total of 9 credits. The first internship consists of a teaching practice and community service programme, in the second internship students complete a field course consisting of a working practicum.

Experts' evaluation

The curriculum of Informatics Education (IE) on the Bachelor's level consists of 147 SKS covering general, educational science, computer science and interdisciplinary courses. The study programme provides the possibility to specialise in one of four topics: Computer Engineering and Networking, Software Engineering, Multimedia, or Intelligent Systems.

The curriculum is divided into four categories of courses. General courses are mandatory and cover topics like languages and government-required courses (e.g. Pancasila). Educational science courses cover general didactics (e.g. Vocational Education, Instructional Design, Microteaching). Field of study courses focus on the basic fields of computer science (e.g. programming, algorithms). Furthermore, interdisciplinary courses enrich the programme (e.g. educational psychology). In the later stages of the programme, students can choose elective courses based on their specialisation. The curriculum then also includes two semesters of field work in schools and educational institutions and the final thesis.

The Universitas Pendidikan Ganesha has a long tradition of teacher education, which is reflected in the curriculum of the Bachelor's programme for Informatics Education. The teaching staff has great experience and the required community services and internships – especially at the end of the study programme, provide students with the chance to work practically in schools and education. Yet, the intended learning outcomes of the Bachelor's programme "Informatics Education" must be improved to adequately reflect the level of

qualification. The current formulation is quite general and does not seem to rely on a common taxonomy (e.g. Bloom) (**Finding 1**). This also applies to the learning outcomes of several modules. In several cases these are only restatements or repetitions of the overall learning outcomes (**Finding 2**).

Overall, the curriculum of the Informatics Education Bachelor's programme is appropriate and covers nearly all the required competencies; it corresponds to the expected competencies of students at Bachelor level, according to the national KKNI framework and the EQF. Its structure and sequence of courses is appropriate and supports the students' progression. The only deficiency regards theoretical computer science. Especially the fields of formal languages, automata theory and complexity seem to be missing and need to be strengthened, to satisfy international standards (**Finding 4**). The experts consider this necessary as these competencies are required in corresponding international study programmes and are part of school curricula.

The curriculum includes a variety of modules covering topics of general didactics. Some of them (e.g. Microteaching and vocational education) seem to include aspects of subject specific didactics. But to strengthen this aspect, the experts recommend the addition or modification of a module concentrating on topic specific didactics, teaching methods and the theory of cognitive processes regarding programming and informatics systems (e.g. problem solving) (**Finding 9**).

In general, the allocation of credits to the modules and courses corresponds to the workload. An exception is the Bachelor's thesis with 6 credits (SKS). This is caused by a different calculation of these credits. Hence, it is recommended that this difference be at least explained in appropriate documents to ease international transfer (see Chapter 4, **Finding 15**). To ease the international transfer of credits for students, the university should consider extending the number of credits for the Bachelor's thesis or to clarify and depict transparently the way in which the workload is calculated.

Conclusion

The criterion is partially fulfilled.

Computer Science (Master)

Description

The Master's programme "Computer Science" covers a total of 42 SKS over 4 semesters. Enrolment is set at 90 students per year. Upon graduation students are awarded a "Master of Computer Science" degree or M.Kom.

UNDIKSHA has defined the following graduate profiles: professionals (in government or companies), who have excellent moral ethics, integrity, and knowledge in the field of computer science; lecturers/researchers (in universities or research institutions) who have moral ethics, integrity, and knowledge in the field of computer science.

According to information in the self-evaluation report, the curriculum has been developed by taking into consideration the recommendations of the Association for Higher Education in Informatics and Computers (APTIKOM) as well as by conducting benchmarking reviews of other similar programmes at universities in Indonesia. The programme leaders have defined 8 programme learning outcomes. The students should thus, among others, be able to design, implement, and develop computer-based systems used in work, education, or research and be able to analyse, evaluate, and recommend computer-based systems used in work, education, or research. The graduates should be able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values following their field of expertise. They should also be able to apply basic concepts of logic, mathematics, algorithms, and data structures in the development of computer-based systems. Finally, they

should be able to analyse the quality, investment techniques, governance, control, and audit of Information Systems/Information Technology in line with organisational strategy.

The curriculum comprises 8 compulsory courses (26 credits, Numeric Computation, Algorithm Design and Analysis, Data Science, Artificial Intelligence, Research Methodology and Scientific Writing, Capita Selecta, Computer and Society and the thesis worth 8 credits) as well as 5 elective courses (15 credits, 18 courses are offered including Internet of Things, Machine Learning, Information Security, e-Business and e-Gov). Students who have a non-linear background must take 4 additional *aanvullen* or bridging courses for 12 credits: Programming Algorithms and Data Structures, Basic Database Technology, Basic Software Engineering, Basic Mobile Computing.

Experts' evaluation

The Computer Science Master's programme offers a well-balanced curriculum. However, its subject-specific qualification outcomes (represented by the PLOs and the Diploma Supplement) are provided in a rather generic form and do not adequately portray the subject-specific contents. The formulation of the PLOs of the programme must therefore be improved using more fine-grained descriptors to clearly encompass both a larger scope of the curricular content and to better reflect the level of qualification (according to the Indonesian National Qualification Framework (KKNI)). Special attention in the rework must be paid to the description of competencies the students gain during their studies (**Finding 1**). It is suggested to consider the use of action verbs and the different levels of Bloom's taxonomy. A mapping table of PLOs, CLOs and graduate profiles might be helpful here as well as for future curriculum assessments. The overarching PLOs include important skills like lifelong learning and critical reflection. It could be considered to explicitly mention teamwork, interdisciplinary education, or education for sustainable development as one of UNDIKSHA's five main educational paradigms. Those aspects are already partially present in the curriculum. Other qualifications that are included in the Bachelor's programme (e.g. taking strategic decisions) should also be considered (for deletion) during the rework process.

In addition to the PLOs, the individual modules' LOs also have to be adapted and the course descriptions must be updated to be more specific on the actual content covered (**Finding 2**).

As with the other programmes, this one meets well the needs of the labour market. During the site visit, labour market representatives and alumni/alumnae stated that they were happy with both the level of qualification and the behaviour of graduates. They are also closely involved in the curricular development and invited every two years to discuss new economic developments and market requirements with the faculty. According to the tracer study, most graduates are employed in the field of Computer Science, and the market is asking for additional graduates to become software developers or hold other programme-related positions.

Scientific research as part of the programme could be improved, e.g. by better including the research of the lecturers into their teaching and also offering more theoretical theses and foundational research (see Chapter 3, **Finding 13**). This also closely relates to the plan of the university and faculty to establish more full professorships as well as a PhD programme in the field of Computer Science, which the experts fully support. According to the tracer study, most students are happy with their thesis supervision.

The programme is structured along a set of mandatory and a broad set of elective courses in a specialisation area. This structure is very much welcomed by the expert panel as it provides the students with a common foundation in Mathematics, Data Science methods and Algorithms, while allowing them to progress in a field of their interest later in their studies. Next to subject-related skills, cross-subject knowledge is provided in the form of lectures on management related fields and in the field of HCI. Methodological and general skills are provided in (group or thesis) projects as well as in a seminar on research methodology and scientific writing. In general, most courses are offered for small groups, which improves the teaching quality.

An idealised typical course plan is made available, and the availability of modules is made transparent to the students. According to the students, the workload is adequately displayed in the SKS awarded by each course. However, this does not hold true for the thesis, where the mode of calculation for the number of hours per SKS is different than for other courses. While this seems to be caused by Indonesian laws and regulations the university cannot change, the experts panel suggests including this fact in the Diploma Supplement in order to facilitate international academic careers (see Chapter 4, **Finding 15**).

Only few students drop out of the programme and most finish within 4 semesters. The workload of the courses may still be too high in peak times, as also reflected by the workload surveys which show that assignments typically take a higher workload than credits awarded. Such workload peaks can especially happen during the mid-term exams and during project delivery deadlines, which according to the students typically happen at a similar time over different courses. Here it is suggested to consider different forms of examination, e.g. oral exams or presentations instead of written tests, where appropriate, and also check whether the time frame could be adapted such that different courses have more diverse deadlines (**Finding 10**).

Conclusion

The criterion is partially fulfilled.

2. Procedures for quality assurance

Bachelor's/Master's degree

The programme is subject to the higher education institution's policy and associated procedures for quality assurance, including procedures for the design, approval, monitoring, and revision of the programmes.

A quality-oriented culture, focusing on continuous quality enhancement, is in place. This includes regular feedback mechanisms involving both internal and external stakeholders.

The strategy, policies, and procedures have a formal status and are made available in published form to all those concerned. They also include roles for students and other stakeholders.

Data is collected from relevant sources and stakeholders, analysed, and used for the effective management and continuous enhancement of the programme.

[ESG 1.1, 1.7 & 1.9]

Description

The quality assurance system at UNDIKSHA refers to the national standards defined for higher education, including national accreditation criteria. It is based on a PDCA cycle / PPEPP cycle of determine, implement, evaluate, control, improve. Centrally, quality assurance mechanisms rely on quality policy documents, quality manuals, quality standards, standard operating procedures, and the relevant supporting forms. The involvement of internal and external stakeholders (lecturers, students, education staff, industry, university partners, and the wider community) is regulated by this framework.

University-wide the Quality Assurance Centre is responsible for the management of the quality assurance system. At faculty and at programme level there are respective Quality Control Clusters/Units. The Quality Control Unit at the level of the faculty is composed of a chairman, a secretary, lecturer representatives from each study programme as well as delegated members in charge of the quality assurance of the study programmes. An Internal Quality Audit is conducted yearly, its aim is it to evaluate the implementation of the set standards, goals, and procedures in every study programme. The audit considers academic as well as non-academic processes. University leadership is involved in reviewing and following up on the results of the audit.

The Quality Control Unit coordinates evaluation measures and reviews the results. Monitoring and evaluation are to be carried out three times per semester. At the beginning of the semester the unit checks the readiness of the learning administration (e.g. as syllabus, lesson plan, lecture contracts, and students assignment plan), the implementation of the learning process until the middle of the semester is checked using the lecturer's teaching agenda, student attendance, and e-learning used during the learning process, and at the end of the semester the aim of the monitoring and evaluation is to check the overall learning process for one semester (using e.g. teaching journals, student attendance, assignments, mid-term exams, final exams, and a list of students' final grades). According to information in the self-evaluation report, the Student Executive Board is involved in a Year-End Performance Activity with the Dean of the faculty.

Part of the evaluation system includes a lecturer performance review / a review of implementation of the learning process standards by the lecturers. Students take part in a survey at the end of every semester. There is also a lecturer survey, a graduate survey and a tracer study conducted centrally every two years. Feedback is gathered on, among others, student satisfaction, employer satisfaction, facilities and infrastructure, research/service partners, stakeholder satisfaction with the faculty collaboration.

Experts' evaluation

In general, it can be stated that the quality assurance system at UNDIKSHA is well developed and at a thorough level. The programmes are subject to the university's policy and the quality system scopes an appropriate range of relevant aspects. A culture of quality enhancement seems to be implemented at all relevant levels of the university's organisation. *Evaluations are carried out every year by the quality assurance team and the results are used as indicators for topics to be improved. It was indicated during the site visit that the results are used as a basis to promote the lecturers and to allocate some funding.* Unfortunately, the links to surveys, results etc. were not provided to the experts in English, which makes it difficult for the expert panel to get deeper insights into how the quality assurance process works and which actual results they offer.

During the site visit the experts gained the strong impression, that student feedback is systematically gathered and considered. In cases where this is not done, direct student involvement could be strengthened, e.g. through student representatives. The collaboration and integration with the labour market and the companies seem to be very tight and reflect a wide variety of aspects, such as a continuous common discussion about labour market needs and requirements and how to integrate these topics into the curricula.

One aspect raised during the discussions was the fact that the tracer study and data gathering appears to be conducted at the level of the faculty and not for each programme. In the view of the experts this should be changed in the future to have the opportunity to develop the individual programmes better. Thus, the experts recommend a more differentiated provision of specific information for each study programme team in the framework of the tracer study and other data gathering exercises. The gathered and analysed information should be made available even more transparently than it is done to date (**Finding 11**).

Conclusion

The criterion is fulfilled.

3. Learning, teaching and assessment of students

Bachelor's/Master's degree

The delivery of material encourages students to take an active role in the learning process.

Students are assessed using accessible criteria, regulations, and procedures, which are made readily available to all participants and which are applied consistently.

Assessment procedures are designed to measure the achievement of the intended learning outcomes.

[ESG 1.3]

Description

According to information in the self-evaluation report, teaching and learning at UNDIKSHA follows a student-centred approach. The goal is to place students as subjects who are active and independent, with psychological conditions as adult learners, fully responsible for their learning, and able to learn beyond the classroom. Further, students should be able to select, find, and organise knowledge as well as to develop their skills – and the lecturers should act as facilitators in the learning process. Generally, the university uses problem-based and project-based learning as learning models to increase creativity and critical thinking. Case-based learning, group discussions, and collaborative learning are also mentioned in the self-evaluation report. The university employs a blended learning system with online elements and more specifically a Flipped-Classroom approach. Asynchronous learning is possible on the university learning platform. Lectures, practical activity in laboratories, practicum, field practice course are possible formats for face-to-face meetings. Field practice courses are defined as a student self-development programme, including community service programme, working practicum, and teaching practicum. UNDIKSHA has developed general guidelines regarding learning strategies, their implementation, the methods employed and learning media to be used.

The university indicates in its self-evaluation report that specific aspects of the curricula contribute to supporting the students' future career, including e.g. cross-study courses, internships, project work, student coaching programmes for competitions/contests, the industrial practitioner lecture programme, entrepreneurial activity programmes and student exchange programmes.

Within the *Tri Dharma* framework UNDIKSHA states that research and community service are integrated in the learning design, and both inform teaching and learning. Students are to be involved in the research activities of the lecturers as e.g. engineers, data collectors or data analysts.

During their studies, the students complete assignments in their courses, as well as a mid-term exam and a final exam for each course. Essays, projects, written tests, oral tests, portfolio, and performance assessments are listed as possible exam formats. Lecturers are expected to develop exams calling on higher-order thinking skills. Attendance to at least 75% of the lectures and 100% of the practicum is required in order to sit the final exam. The university has a complaints and appeals procedure in place: the students should first contact the lecturer in charge of the course, then the academic advisor and finally the study programme coordinator.

Experts' evaluation

Overall, the teaching, learning, and assessment at UNDIKSHA are well delivered, supported, and monitored. The university provides conducive physical infrastructure (e.g., labs, classrooms, etc.), facilities (e.g., library, consultation, etc.), and digital platforms (e.g., LMS, messaging system, e-library, e-journal, etc.). The university has planned for physical extension to cater to the growing number of students. The programmes under review receive a diverse student enrolment from local (i.e., Bali), national, inbound (e.g., Philippine) as well as outbound mobility (i.e., to national and international universities) students. Currently, there are more male students enrolled in the programmes, but this is considered a common scenario in this field of study (i.e., engineering & technology).

The programmes' assessment principles, methods, and practices are aligned with the programme learning outcomes. A variety of assessment methods in the programmes are described. The consistency between the programme assessment and learning outcomes is periodically reviewed (i.e., upon course completion, upon graduation, and a few years after graduation) and improved through several exercises (e.g., student's direct assessments, final assessment, course feedback, exit survey, alumni survey, employer satisfaction survey, curriculum review at the end of each cycle, and external feedback i.e., industries). The programmes provide flexibility for the lecturers to choose the module assessment methods (within the framework of the guidelines of the faculty). Thus, the module assessment is based on the teaching method and the learning outcomes of the course besides students' participation and written tests.

The Bachelor's study programmes also implement MBKM (Freedom to Learn – Independent Campus) in which the students are provided an opportunity to practice skills based on their interests by going, among others, into the workforce. The programmes include students' placements in fieldwork in related settings e.g., schools, government agencies, software houses, etc. in which the students would apply the knowledge they learned in a real-world setting. Meanwhile, the programmes link theoretical and practical aspects in several ways for example practicums and fieldwork (up to 6 months).

The institution has appropriate examination procedures including preparing exam schedules for the midterm exams and final exams, disseminating exam schedules on the academic calendar to the academic communities, and accessible to the students through the university website. The students in all programmes are graded based on a standard reference called the Benchmark Reference Assessment. Still, the experts recommend the faculty carries out additional assessment methods to evaluate the learning outcomes of students in different stages including programme benchmarking with international universities, and entrance survey. By having inclusive ways to assess student achievement of learning outcomes it would help the faculty understand further the effectiveness of their modules/courses and programmes (**Finding 12**).

The university clarified its fast-track programme and questions related to its implementation during the site visit. It was explained that the students could apply for a fast-track programme in the sixth semester and that selection is made by the lecturers. The learning delivery for the fast-track programme is only possible in offline mode. While the overall areas in teaching, learning and assessment can be seen positively after the initial analysis and the site visit, the experts see areas for further improvement, especially in the key topics of research and teaching, digital resources, and external engagement.

While interlacing between research and teaching is happening, the university did not provide details regarding the implementation and inclusivity of this approach in all programmes. The experts thus recommend the faculty devises a clear strategy on how to connect the departments' research activities and teaching to ensure deliberate and active sharing of the latest knowledge/technology with the students (**Finding 13**). One example is the systematic involvement of students in research activities. Furthermore, research-based teaching and learning methods could be used throughout the later stages of the study programmes.

Digital resources for teaching and research are available however some programmes have specific requirements to ensure students acquire the proper materials and skills (see Chapter 6, **Finding 20**).

During the site visit, the expert panel also enquired about the strategy to support teaching when there is a small number of teaching staff and seniority level in certain programmes (see also Chapter 5). The university mentioned that modules/courses are also supported by cooperation between teaching staffs of different departments and faculties. The teaching staff from other departments are assigned if they have related backgrounds (e.g., computer science). In addition, there are modules with joint teaching modes between teaching staff from UNDIKSHA and other universities. Some current staffs also have prior industry experience. In this respect, external engagement of research labs/groups and industry could be promoted further in certain areas (e.g., advanced topics such as robotics) to enrich the student learning experience and facilitation. The experts

recommend the faculty engages with external collaborations (e.g., established research lab or industry) in students' learning and research related to advanced topics (e.g., robotics) for additional facilitation, equipment, and expertise that is conceivably limited in the current settings (**Finding 14**). External engagement is also suggested to further foster and support students in carrying out projects that are taken from real-world industry in their final year project thesis.

Conclusion

The criterion is fulfilled.

4. Student admission, progression, recognition and certification

Bachelor's/Master's degree
Consistently applied, pre-defined, and published regulations are in place which cover student admission, progression, recognition, and certification.
[ESG 1.4]

Description

Admission to study programmes at UNDIKSHA takes place through three streams: the national State University National Entrance Exam (based on a portfolio and the students' achievements in secondary education), the national Joint Entrance Selection of State Universities (based on written tests), or the Independent Entrance Selection of New Students carried out by the university directly. In the independent selection format there are four distinct options: the 'Interest and Talent' pathway, admission through a computer-based test, the Postgraduate Students admission, and transfer credit-students.

According to information in the self-evaluation report, applicants for the Bachelor's programme "Computer Science" must be high school graduates in a Science or Engineering major. There are no further subject-specific requirements for the other Bachelor's programmes under review. Applicants for the Master's programme "Computer Science" are selected based on a portfolio they submit, referring to their previous studies and already published scientific work. In the Master's programme there is a cooperation with the Mariano Marcos State University in the Philippines, through which, Philippine students can take courses of the Indonesian study programme. These students are selected based on their English competencies and a portfolio referring to their previous studies – additionally they take a special 'Initiation of International Class' before joining the study programme.

The workload, credit system as well as grading and progression are regulated in the academic guidelines of UNDIKSHA. One semester consists of 14 meetings, 1 mid-term exam and 1 final exam. Students can take a maximum of 24 SKS in one semester depending on the number of SKS they have completed in the previous semester. According to the typical study plans, students should take between 14 and 24 SKS in the first seven semesters of their Bachelor's studies. In their eighth semester they complete their final thesis. In the Master's programme they should complete between 6 and 14 SKS per semester. During their studies, students are guided by an academic advisor. A specific monitoring scheme is put in place regarding the development of the final thesis with thesis advisors.

In the framework of the national Independent Campus policy, students can take classes outside of their study programme and conduct off campus activities. The university has development recognition guidelines for these activities. UNDIKSHA lists in its self-evaluation report examples of student exchanges in the past years, internationally with e.g. Taiwan or nationally within Indonesia. The university also mentions the organisation of an International Virtual Summer School. In addition to their degrees, students are encouraged to complete

professional/industry certifications as well as language proficiency tests during their studies. Upon graduation they are awarded with their diploma, a transcript of records as well as a diploma supplement also listing activities outside of the set courses of the study programme considered to be graduate achievements.

Experts' evaluation

It can be stated that the regulations for admission are clear and transparent for all applicants. The process of progression for all study programmes seems to be well conducted through the organised talks with academic advisors along the student lifecycle. For the panel of experts it was a little bit surprising however that the academic supervisors monitor both academic and non-academic activities, this appears to be a given in the Indonesian context.

Further, the recognition process as well as the use of micro-credentials remains unclear to a certain extent. Although a credit transfer is possible, the conversion between SKS and ECTS as well as the size of the courses (small number of credits) cause some problems due to the calculation and conversion method used. This topic was raised during the site visit. The university mentioned that the faculty will consult with the partner university to find an agreement on the matching courses. So far, there are several students doing outbound mobility with universities in the Philippines and Taiwan. However, during the pandemic, the students' outbound mobility was conducted online. Regarding the mobility of students there is a bundle of measures that should enhance the exchange activities. Since 2019 e.g. there are initiatives to establish "internationalisation at home" (invite more international students and send students abroad) especially in cooperation with Southeast Asian countries. Moreover, a graduates' transfer programme (both ways) with the Philippines is in progress and UNIDKSHA provides scholarships for foreign students. In the future, some more international partnerships should be provided (**Finding 21**, see also Chapter 6). Due to the pandemic a lot of exchange activities had to be carried online (virtual mobility), which is good, but should not limit the options for students (virtual and physical).

Referring to the discussion with the students, the experts consider that the English language skills are quite impressive. Students can take free language courses to motivate them to go abroad (e.g., French for a new cooperation with France). Thus, it could be helpful for incoming students to provide more material in English language (at least for the Master's programme), and also to provide more courses in English language. This would be beneficial for all students, local students, and incoming students.

The students receive the necessary documents upon graduation. Yet, the experts recommend that the Diploma Supplement provided by the university includes information on the specific concentration chosen by the students in each programme. Further, it should also include transparent information on the workload (hours) of the thesis (**Finding 15**).

Conclusion

The criterion is fulfilled.

5. Teaching staff

Bachelor's/Master's degree

The composition (quantity, qualifications, professional and international experience, etc.) of the staff is appropriate for the achievement of the intended learning outcomes.

Staff involved with teaching is qualified and competent to do so.

Transparent procedures are in place for the recruitment and development of staff.

[ESG 1.5]

Description

According to information in the self-evaluation report, the need for teaching staff is checked within a mapping exercise for a period of five years at faculty level. Selection of new teaching staff is based on a first Basic Competency Test followed by a Teaching Competency Test. Based on national regulations, the workload of teaching staff ranges from 12 to 16 credits per semester. Within the framework of the *Tri Dharma* of higher education the lecturers' workload refers to teaching, research, and community service. UNDIKSHA states that there is no separate teaching performance review process but that the implementation of educational standards and strategic goals are checked and reviewed within the university's overall quality assurance system.

For the Bachelor's programme "Computer Science" there are 1 associate professor, 8 assistant professors, 2 expert assistants/instructors and 2 external lecturers. For the Bachelor's programme "Information System" there are 9 assistant professors and 8 external lecturers. For the Bachelor's programme "Informatics Education" there are 2 associate professors, 8 assistant professors and 4 lecturers. For the Master's programme "Computer Science" there are 2 full professors, 3 associate professors and 6 assistant professors.

According to information in the self-evaluation report, practitioners can be involved in courses and lectures given by academics of the university on an ad-hoc basis through the 'Call for Practitioners' programme. Practitioner lecturers must meet certain requirements before being involved in the teaching process, they must among others have a Master's degree. There are also invited guest lecturers and visiting professors. UNDIKSHA states that the programmes are supported by 27 additional staff at faculty level, including laboratory assistants, administrative staffs as well as operators and other staff.

The university's staff development policy includes support for continuing education by lecturers, funding research, as well as training workshops (including on tools for student-centred learning, on teaching methods in a blended learning setting or on developing assessment methods) internally and externally. New lecturers have access to the corresponding national training schemes. According to a Rector's policy all lecturers who currently have a Master's degree must have started their doctoral studies by 2026. The development of research capacity and activities is part of the faculty's Operational plan.

Experts' evaluation

The Universitas Pendidikan Ganesha presented a comprehensive list of teaching staff and their academic qualification, their research and other relevant qualification. The provided information proves that the qualification as well as the number of teaching staff and teaching hours is appropriate for the study programmes and the number of students. Since the wide variety of contracts expires in 2040 or later, the continuity of the programme in the next years, even decades, appears to be guaranteed.

During the site visit, the experts discussed extensively the number of teaching staff and academic seniority to support the "Computer Science" Bachelor's programme. The department indicated that even though the programme is relatively new (started in 2018), the current staff has prior experience and additional lecturers from other departments/subject areas contribute to the courses. A majority of the additional lecturers have Computer

Science backgrounds. The university representatives also mentioned that levelling up seniority requires the teaching staff to fulfil three key areas (teaching, research, and community service) and to receive good support from the university by limiting administrative burden and by receiving funding (research). The university encourages them to disseminate their research output in community service projects e.g., augmented reality project in school. Therefore, the experts recommend that the department actively facilitates teaching staff moving up the academic ladder to ensure adequate Associate Professors or Professors in the near future to lead and support the study programme in research, teaching, and curriculum development.

Due to the fact that the study programmes – with exception of "Informatics Education" – were established only a few years ago, the seniority of teaching staff is an issue for improvement throughout. This includes the assignment of at least one full professor to each programme. During the site visit it became clear, that the faculty supports the teaching staff in their development. Nonetheless, to strengthen this aspect, the experts explicitly recommend the implementation of structured development programme, especially a PhD programme for graduates and a development programme for PhD holders (e.g. tenure tracks) (**Findings 16 & 17**).

Conclusion

The criterion is fulfilled.

6. Learning resources and student support

Bachelor's/Master's degree
Appropriate facilities and resources are available for learning and teaching activities.
Guidance and support is available for students which includes advice on achieving a successful completion of their studies.
[ESG 1.6]

Description

At the beginning of each semester, students receive a semester schedule as well as Semester Lesson Plans or RPS. The RPS detail the contents, the learning outcomes, time allocation, the teaching methods, the assessments, the learning materials of each course for all the meetings in the semester. The students can also access this information on the academic information system platform of the university. RPS are evaluated as part of the quality assurance measures at the end of each semester.

For each study programme there is a campus orientation event as well as introduction activities for new students. Students are assigned an academic advisor at the beginning of their studies, the advisor supports students in academic and non-academic matters, including the planning of semester, the choice of courses, and GPA results. The advisor should check on their progression every semester using among other data available on the academic information system platform of UNDIKSHA. For their final thesis students work with a thesis advisor, who they meet at least five times. Additionally, students have access to the central Guidance and Counselling Unit of the university. The programme leaders also mention in the self-evaluation report the services by the Integrated Education Laboratory and the Institute of Teachers' Education to support students in developing their competencies in the pedagogical field, e.g. through micro-teaching. Further services include units for interest and talent, soft skills development, career and entrepreneurship guidance, scholarship, and health services, the central university library. There are scholarships provided by the university directly as well as nationwide scholarship schemes.

At the level of the university there is a Student Executive Board as well as a Student Consultative Assembly; they are accompanied by a Faculty-Student Senate and by Study Programme Student Associations.

The faculty has a masterplan to further develop and improve the equipment of its laboratories.

Experts' evaluation

Students are informed digitally about programme-relevant information via the website and the internal platform, which also provide the course material to students. However, the public website does not contain all the information on courses and module descriptions (module catalogue), a comprehensive overview of learning outcomes for the individual programmes, or details about methods of learning, teaching, and assessment. These documents should be made available in a single place (by programme), to enable prospective and current students of all the programmes to access information (**Finding 18**, see also Chapter 7). As mentioned previously the experts believe that the quality of the course descriptions of all programmes must be improved: the level of details must be improved and be made consistent between different courses in the same programme and between the different programmes (see Chapter 1, **Finding 2**). The course descriptions of the pedagogical courses (Informatics Education) and of the national general compulsory courses should be used as examples.

During the site visit the experts discussed the accessibility of laboratories and lecture halls for students' use. The university indicated that the facilities are open during office hours (7:30-17:00) which the students can use for classes and practical courses. The students could also use the lab in their free time by contacting a coordinator. Regarding the lecture hall/laboratories capacity and potential extension requirements, the university explained that a lab could accommodate up to 25 students and classrooms are mainly used for theory sessions. For a programme with 170 students in one cohort, the students are divided into max. 25 students per class and labs are scheduled for each class. Currently, the capacity of labs and lecture halls is sufficient however overseeing the growth in the coming years the university already had an expansion plan approved. Since courses are typically split up in smaller classes, the facilities offer sufficient space. UNDIKSHA offers good IT and infrastructure support for teaching and learning. Computer workplaces and laboratories are made available to students after consultation and students can meet on campus to conduct group work. The laboratories are each adequately maintained by a laboratory executive. According to the feedback of the students, the robotics lab could be extended to allow for a wider range of projects. The library is adequate – yet the experts recommend the university expands the e-journal/e-library resources (**Finding 19**). Resources such as the e-library of the AIS are important in the field of Information Systems. The faculty should also provide more specialised and appropriate software for Computer Science (e.g. for modelling). Here, the experts recommend the faculty considers providing and exposing the students to appropriate software for learning and research purposes to ensure suitable software is used to carry out specific tasks. For instance, CASE tools for software modelling, software testing and statistical software for analysis, Matlab for numerical processing, etc. (**Finding 20**). UNDIKSHA does not offer remote access to their computer facilities. It would however be nice if students were able to access both computing power, software and storage via their home network (e.g. via a VPN).

Courses are mostly set for specific semesters and overlaps have not been reported. Students are supported in finding internships since the university holds many active partnerships with different private and public agencies.

The counselling for all the programmes is good. Academic advisors are available to the students for all study and non-study related consulting. They help students with their course choice and if problems occur. Additionally, the course and programme coordinators can be consulted. During the site visit the university provided additional information on the procedure for handling struggling students. The university explained that students who are struggling in their courses could consult their lecturers. Meanwhile, the students could also consult their academic advisors for guidance in selecting modules/courses and programme concentration (or major) as well as guidance in dealing with academic challenges. Eventually, the head of study programme is also made aware of the students' struggle and the students' progress is monitored. As for the Master's programme,

the students are able to consult their academic supervisor in choosing elective courses and thesis research topic.

There are some scholarships available and tuition fees depend on the family's income. It has been reported that a very low number of students drops out of their studies due to financial issues.

The programmes offer few exchange possibilities, including virtual exchange for micro-credentials. To improve exchange, all information and course material should all be (made) available in English at least for the Master of Computer Science programme. In order to facilitate international student mobility and to support students wishing to continue their studies abroad, the university should provide transparent information for non-Indonesian interlocutors on the workload in all the programmes (e.g. a complete and coherent credit conversion table, including workload differences for each SKS for the final thesis) (**Finding 21**, see also Chapter 4). Information on the credits should be included in the Diploma Supplement (see Chapter 4, **Finding 15**).

Diversity is not explicitly considered during the curricular evaluation process. It is suggested that gender-specific numbers are tracked in order to identify structural differences.

Conclusion

The criterion is partially fulfilled.

7. Information

Bachelor's/Master's degree
Impartial and objective, up-to-date information regarding the programme and its qualifications is published regularly. This published information is appropriate for and available to relevant stakeholders.
[ESG 1.8]

Description

Each programme has its own webpage on the website of the university. It includes information on the results/output of the programme, on the degrees awarded and the content of the programmes. Information on the learning and assessment procedures are available on the learning platform of the university. UNDIKSHA also provides information to prospective and current students on social media channels.

Experts' evaluation

The website provides information for students and other stakeholders in an appropriate way. The curriculum of each study programme is accessible – one improvement that the university could make is that the overall curriculum and the course descriptions should be also accessible in English to ease the transfer when students engage in international exchange and mobility programmes (see Chapter 6, **Finding 18**). Also, the webpages would need to be reworked as there are some empty pages where information is missing (e.g. pages "course schedule", "learning resources").

Conclusion

The criterion is fulfilled.

V. Recommendation of the panel of experts

The panel of experts recommends accrediting the study programmes “Computer Science” (Bachelor of Computer Science), “Information System” (Bachelor of Computer Science), “Informatics Education” (Bachelor of Education) and “Computer Science” (Master of Computer Science) offered by Universitas Pendidikan Ganesha (Indonesia) with conditions.

Findings:

1. The formulation of the Programme Learning Outcomes of the Computer Science (Bachelor and Master) programmes and the Bachelor’s programme Informatics Education must be improved to clearly depict the level of the qualification. Special attention must be given to active verbs and the different levels of the taxonomy according to Bloom.
2. The course descriptions of all programmes must be improved: the level of details must be improved and be made consistent between different courses in the same programme and between the different programmes.
3. When reviewing the course descriptions, special attention should also be given to providing current references (literature) and to indicating pre-requisite module/course in all courses.
4. A Theory of Computation (i.e., automata theory, complexity, and formal languages) course must be included in the Computer Science (Bachelor) and Informatics Education curricula.
5. The curriculum of Bachelor’s programme of Computer Science should be updated:
    a. Courses on Software Engineering should be provided prior to courses on Human-Computer Interaction.
    b. The course on Introduction to Information Technology should be dropped.
    c. A Software Modelling course should be included.
    d. The curriculum should deal more explicitly with the area of computer security and address topics such as UI/UX and design thinking.
6. The university should consider extending the credits for the Bachelor’s thesis in the Bachelor’s programme Information System.
7. Basic mathematics (such as analysis, linear algebra, discreet mathematics, …) must be included in the Information System curriculum and depicted clearly in the corresponding course descriptions.
8. The curriculum of Bachelor’s programme of Information System should be updated:
    a. Basic courses on business and management should be offered earlier in the curriculum.
    b. Emerging topics like digital innovation or cyber-physical systems should be considered as potential addition in the next curriculum review.
9. The Informatics Education curriculum should deal in more details with topic specific didactics, teaching methods and the theory of cognitive processes regarding programming and informatics systems.
10. In the Master’s programme Computer Science different forms of examination should be considered and the deadlines of the examinations should be checked against each other.
11. UNDIKSHA should provide each study programme team with study programme specific information in the framework of the tracer study and other data gathering exercises. The information should be made available more transparently.

12. The university should strive to diversify its assessment methods and include additional inclusive methods to evaluate the attainment of learning outcomes by students in different stages (e.g. programme benchmarking with international universities, and entrance survey).
13. The inclusion of lecturers' research in teaching should be improved.
14. The faculty should engage more with external collaborations (e.g., established research lab or industry) in students' learning and research related to advanced topics (e.g., robotics).
15. The Diploma Supplement provided by the university should include information on the specific concentration chosen by the students in each programme. It should also include transparent information on the workload (hours) of the thesis.
16. The experts encourage UNDIKSHA in developing its teaching staff further (structured development programme for PhD holders) and assigning senior staff (at least one full professor) to each programme.
17. The experts encourage UNDIKSHA in implementing a structured development programme for teaching staff, leading them to a PhD.
18. The full course descriptions should be made available in English and in a single place on the university website for both prospective and current students.
19. The university should expand its the e-journal/e-library resources.
20. The faculty should provide more specialised and appropriate software for Computer Science (e.g. for modelling).
21. In order to facilitate international student mobility and to support students wishing to continue their studies abroad, the university should provide transparent information for non-Indonesian interlocutors on the workload in all the programmes (e.g. a complete and coherent credit conversion table). The university should generally develop its international partnerships.