



ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Environmental Management Engineering

Provided by
Universidad Juárez del Estado de Durango, Durango,
Mexico

Version: 20 September 2019

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A About the Accreditation Process

| Name of the degree programme (in original language) | (Official) English translation of the name | Labels applied for ¹ | Previous accreditation (issuing agency, validity) | Involved Technical Committees (TC) ² |
|---|--|---------------------------------|---|---|
| Ingeniería en Manejo Ambiental | Environmental Management Engineering | ASIIN | CIEES, 26.02.2014-25.02.2019 | TC 08 TC 10 |
| <p>Date of the contract: 30.08.2017</p> <p>Submission of the final version of the self-assessment report: 13.02.2018</p> <p>Date of the onsite visit: 23-25.04.2018</p> <p>at: Campus Durango</p> | | | | |
| <p>Peer panel:</p> <p>Prof. Dr. Friedhelm Meinhardt, University of Münster Dr. habil. Philipp Grundmann, Humboldt University Berlin Dr. Timothy Synnott, Independent Forrester, Forest Stewardship Council Fatima del Carmen Acevedo Benitez, Universidad Autonoma de Nuevo Leon, Student</p> | | | | |
| <p>Representative of the ASIIN headquarter: Dr. Iring Wasser</p> | | | | |
| <p>Responsible decision-making committee: Accreditation Commission for Degree Programmes</p> | | | | |
| <p>Criteria used:</p> <p>European Standards and Guidelines as of 10.05.2015</p> <p>ASIIN General Criteria, as of 28.06.2012</p> <p>Subject-Specific Criteria of Technical Committee 08 – Agronomy, Nutritional Sciences and Landscape Architecture as of 09.12.2011</p> | | | | |

¹ ASIIN Seal for degree programmes

² TC: TC 08 – Agronomy, Nutritional Sciences and Landscape Architecture, TC 10 – Life Sciences

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|--|
| Subject-Specific Criteria of Technical Committee 10 – Life Sciences as of 09.12.2011 |
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In order to facilitate the legibility of this document, only masculine noun forms will be used hereinafter. Any gender-specific terms used in this document apply to both women and men.

B Characteristics of the Degree Programme

| a) Name | Final degree (original/English translation) | b) Areas of Specialization | c) Corresponding level of the EQF ³ | d) Mode of Study | e) Double/Joint Degree | f) Duration | g) Credit points/unit | h) Intake rhythm & First time of offer |
|--------------------------------------|---|--|--|------------------|------------------------|-------------|----------------------------|---|
| Environmental Management Engineering | Ingeniería en Manego Ambiental/Engineer in Environmental Management | Environmental management and audit systems Consulting and Environmental impact assessment Environmental services and risk analysis Water quality and treatment, air quality projects, soil bioremediation programs, toxic and hazardous waste integral management | Level 6 | Full time | no | 9 Semester | 179 ECTS/302 ACATS credits | Intake twice/year; offered in current version since August 2013 |

According to the self-assessment report, the Bachelor degree programme “Environmental Management Engineering” has been designed to achieve the following curricular learning objectives:

“Its general objective is to train environmental engineers who master the professional competences in their area for applying them in the environmental management; who make possible the solution of environmental problems in an integrated way, taking into account the sustainability dimensions (social, economic, and environmental) based on the environmental technology and regulations.

The programme also trains professionals with the necessary competences for applying the elements for environmental planning, making possible the performance of environmental projects either in the urban or rural areas as well as in ecological protected ones. In addition

³ EQF = The European Qualifications Framework for lifelong learning

they count with the technical and scientific knowledge for performing audits and functions for increasing the quality of environmental services, likewise, the capabilities for preventing and restoring the environmental deterioration and the pollutant control in different kinds of industries, waste treatment and air, water and soil pollution”.

On the website of the faculty, further specifications are given: (http://forestaes.ujed.mx/forestaes/en/oferta_educativa_ima_objetivos.php)

“The programme, all along the educative trajectory, has the purpose of training professionals with the knowledge, skills and abilities, with a high level for performing activities in their knowledge field, such as planning, organizing, directing and executing actions which allow to preserve and improve the environment, as well as to control and correct the impacts caused by human activities.”

Professional knowledge, skills and competences to be expected of and demonstrated by graduates from the Environmental Management Engineering degree programme in various area, listed below, are as follows:

- **Environmental quality management and audits systems.** The professional manages, audits and performs functions which increase the quality of the environmental services aligned to the technical, ethic and scientific knowledge of the profession.
- **Counselling and environmental impact assessment.** The graduate provides counselling and strategic assessment services to enterprises and institutions regarding environmental impact based on ethic and sustainability criteria.
- **Natural environment management.** The graduate manages natural spaces and their use assessing the environmental risk supported by advanced technologies with ethic and professional criteria.
- **Management of water quality and treatment.** The graduate manages programmes and projects for the use of water and manages its analysis and treatment processes for domestic and productive use.
- **Management of air quality and treatment.** The graduate manages processes, samplings, regulation, programmes and projects of air quality.

B Characteristics of the Degree Programme

- **Management of soil quality and treatment.** The graduated designs and manages programmes of soil bioremediation.

Similarly, the graduate acquires along his training the following generic competences, which train him integrally and enrich him as human being, allowing him to have a better performance in his personal, professional and working life:

- Social responsibility and citizen commitment; capability for oral and written communication; capacity for communicating in a second language
- Skills in the use of TICs
- Capability for lifelong learning; Skills for searching, processing and analyzing information from different source
- Capability for identifying, posing and solving problems; Capability for taking decisions
- Skills for working autonomously as well as capacity for team work;
- Commitment for the environment preservation as well as the social environment
- Appraisalment and respect for diversity and multicultural settings; skills for working in international contexts
- Capability for developing and managing projects

The following **curriculum** is presented:

| FIRST | SECOND | TIRTH | FOURTH | FIFTH | SIXTH | SEVENTH | EIGHTH | NINETH |
|--|-------------------------------------|-----------------------------------|--|--|--------------------------------------|---|-----------------------------|-------------------------------|
| <u>Computing</u> 6 c | Earth sciences 4 c | <u>Digital cartography</u> 5 c | <u>Geographic information systems</u> 5 c | <u>Ecological management</u> 5 c | <u>Territorial management</u> 4 c | <u>Environmental impact assessment</u> 6 c | Elective 3 Block 1 4c | Professional residence 15c |
| <u>Critical and creative thinking abilities</u> 6 c | <u>Environmental biology</u> 4 c | <u>Microbiology</u> 4 c | Environmental genetics 4c | <u>Resources sustainability</u> 4 c | Wildlife areas management 5c | Elective 1 Block 2 4c | Elective 3 Block 2 4c | |
| <u>Reading and writing</u> 6 c | <u>Research methodology</u> 4 c | Health and environment 4c | <u>Green areas design</u> 4 c | <u>Contaminant processes management</u> 5 c | <u>Environmental systems</u> 6 c | Research seminar 1 4c | Research seminar II 4c | |

B Characteristics of the Degree Programme

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|---------------------------------------|-----------------------------------|------------------------------------|--|--|--|------------------------------------|----------------------------------|------------------|----|
| <u>Environmental education</u> 6 c | <u>Ecology</u> 4 c | Environmental regulations 4c | <u>Environmental Audit</u> 4 c | <u>Environmental management</u> 5 c | <u>Environmental economy</u> 4 c | Elective 1 Block 1 4c | Receptional experience 10c | | |
| <u>Chemistry</u> 5 c | <u>Biochemistry</u> 5 c | <u>Biotechnology</u> 5 c | <u>Environmental Toxicology</u> 5 c | <u>Solid waste management</u> 5 c | <u>Hazardous waste management</u> 5 c | <u>Soils bioremediation</u> 6 c | | | |
| <u>Mathematics</u> 5 c | <u>Statistical methods</u> 6 c | <u>Statistical sampling</u> 5 c | <u>Air contamination</u> 5 c | <u>Soil contamination</u> 4 c | <u>Natural risks management</u> 5 c | Elective 2 Block 1 4c | | | |
| <u>Physics</u> 4 c | <u>Thermodynamics</u> 5 c | <u>Physiochemistry</u> 5 c | <u>Instrumental analysis</u> 5 c | <u>Water contamination</u> 5 c | Quality and water treatment 5c | Elective 2 Block 2 4c | | | |
| | FI 2c | FI 2c | FI 2c | FI 2c | FI 2 c | FI 2c | | | |
| English certification A2 3c | | | English certification B1 7c | | | | | | |
| | | | | | | Social service 10c | | | |
| 38 | 34 | 37 | 34 | 35 | 36 | 34 | | 29 | 25 |
| | | | | | | | | TOTAL 302 | |

| BASIC AREA | DISCIPLINARY AREA | TERMINAL AREA | INTEGRAL AREA |
|----------------------------------|----------------------------------|----------------------------------|---------------------------------------|
| 69c = 23% | 149c = 49.66% | 62c = 20.66% | 22c = 7% |
| Educational Model UJED 20.30% | Educational Model UJED 50-60% | Educational Model UJED 15-20% | Educational Model UJED up to a 10% |

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

- Programme web site: http://forestaes.ujed.mx/en/_oferta_educativa_icf_perfil_egreso.php
- Learning units matrix
- Analysis of graduates' and employers' surveys

Preliminary assessment and analysis of the peers:

The programme in environmental management engineering is a comparatively new educational offering in the faculty of forestry at the University of Durango, which started its operation in fall of 2013 and is only now about to produce graduates of its first batch of students. The programme has been developed out of a predecessor program, labelled environmental management of natural resources, which was reviewed and accredited by the Interinstitutional Committee for Higher Education Assessment (CIEES) in 2014. The focus of the new programme as described in the SAR is on:

- Managing, auditing, exercising functions that increase the quality of environmental services aligned to the technical/scientific knowledge and ethic of the profession.
- Providing counselling and strategic assessing services to enterprises and institutions regarding environmental impact based on ethic and sustainability criteria.
- Proposing solutions regarding treatment of industrial waste and environmental, water, air and soil contamination using scientific and professional knowledge.
- Managing natural spaces and their use, assessing environmental risk and supported by advanced technologies with ethic and professional criterion.

The panel during the audit discussed the above enumerated programme objectives and intended learning outcomes as defined by the Faculty of Forestry Sciences with the program coordinators and the staff of the faculty. Discussions revolved around the definition, of what environmental management is and what it is for.

In line with current scientific definitions, environmental management can generally be defined as the practices and systems of an organization to comply with its legal and regulatory environmental obligation, taking account of local and regional problems, and of public opinion and market requirements. For the panel, aspects of mining, forestry, logging, agriculture, ranching, infrastructure, urbanization, tourism, communications, waste disposal (liquid and solid), water supplies, manufacturing and other industries that cause environmental impacts, are at the core of future challenges for the graduates of the programme under review.

The environmental management programme clearly has been developed in response to these new regulations and the above-mentioned considerable list of impact factors on the environment. In the eyes of the experts, the curriculum before this background should consequently provide sufficient information about how these industries operate, how they cause negative impacts and how they can be avoided, mitigated as well as measured. The curriculum would also gain by including more in depth knowledge regarding the environmental impact and market expectations for various industrial production systems. In the corresponding forestry program of the department at UJED, there is already a clear understanding that forest products have increasingly to comply with FSC standards. The students should consequently be made aware that similar requirements are affecting other markets.

After the discussions during the onsite visit there is a common understanding also among the faculty staff that there is value in further clarifying the programme learning outcomes in a more concise manner, defining and writing more clearly, what the program is really focusing on taking into account the lines of reasoning mentioned above.

In terms of involving stakeholders in the drafting and further developing of programme objectives, the panel positively notes that before the launch of the current programme in environmental management engineering, a thorough stakeholder process had taken place, involving representatives from the academic community, industry and governmental agencies. As mentioned before, also the result of external accreditation processes influenced the design of the new program prior to its start in 2013. Since then, however, stakeholder involvement for the continuous improvement of the programme has considerably slowed down. At the very moment, the internal revision process of the program is under way. This constitutes a perfect opportunity for reinforcing feedback loops with industry partners, students and alumni (of the old program) in a structured way.

No definite answer can be given with regard to the question of acceptance of the competence profile of environmental management engineers on the local, regional and national labor market. Stakeholders from industry, interviewed during the on-site visit, did not report to have employed graduates from this particular programme and also not many experiences with interns (as part of the so called professional residence experience) were presented. The panel nevertheless is optimistic that the generalist approach together with a sound scientific base will provide future graduates with promising job opportunities in the Mexican and international labor markets.

Criterion 1.2 Name of the degree programme

Evidence:

- Regulation of the Faculty about Awarding of Degrees (*Reglamento de Titulación*) of June 2010
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel discusses the name of the programme in relation to the intended objectives, curriculum as well as the degree awarded. In particular, the question is on the table to which extent the programme targets both environmental **management** and environmental **engineering**.

In the view of the panel, core elements of engineering analysis, design and practice cannot be identified in the programme to a substantial degree. According to their option, it focuses rather on the scientific aspects of the subject area. The name “environmental management” thus better suits the programme. The peers understand that in the Mexican context the term engineering is included as it is directly connected to the degree awarded, *ingeniero*, which has a high reputation in Mexican society. Nevertheless, they insist that the objective of the programme is not to train engineers in the true sense of the term. Consequently, the inclusion of the term engineering in the title of the programme might cause confusion because of the actual focus of the programme rather on environmental management than on environmental management engineering.

Criterion 1.3 Curriculum

Evidence:

- Curricular overview as published on the website:
<http://forestales.ujed.mx/forestales/en/index.php>
- Module (learning unit) descriptions

- Learning units matrix
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The curricular structure is referred to and depicted as a map in the first part of this report. The panel acknowledges that the curriculum is divided into learning units and modules, which form a convincing educational pathway.

While from an overall perspective the structure of the curriculum is in line with expectations, there are however a number of elements which are of concern and consequently need attention. This is described in detail under section 2.1 of this report.

In terms of alignment of the module learning outcomes with the overall programme learning outcomes/competence profiles, the faculty has provided an objectives-module/learning unit matrix, matching the learning outcomes with the subject specific requirements of ASIIN as well as an extensive module handbook. In spite of the large volume of documents provided, the peers lack information in order to infer how the individual learning units/module contribute to the above described overarching programme learning outcomes and competence profiles. While the individual module descriptions follow a uniform scheme and provide extensive formal information, they do not allow inferring what is really being taught in the individual modules and on what level/which depth knowledge, skills, competences and values are acquired.

In order for the peers to come with a final conclusion, the learning unit/module handbook needs consequently to be revised/updated and resubmitted for that purpose.

As to the revision of the program, during the phase of its establishment a coherent and extensive stakeholder approach had been undertaken. Feedback from industry as well as the results of an external evaluation by the Institutional Committee for Higher Education Assessment (CIEES) fed into the design of the new program and structured the transition from the environmental management in natural resources to the environmental management in engineering programme. Since then, however, only minor adjustments to the program have been effectuated, external stakeholder feedback has been slow to come in. This is however a necessity given the fact that the program is now up for revision. Student opinion needs, the structured feedback from industrial cooperation partners and responses from the first alumni etc. will have to be taken into account for the upcoming revision of the programme.

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|---|
| Criterion 1.4 Admission requirements |
|---|

Evidence:

- Admission regulations: <http://escolares.ujed.mx/publico/Informacion.aspx>; <http://www.ujed.mx/portal/Publico/Noticias.aspx?ipNoticia=2972>
- Information about the expected profile of incoming students published on the website: http://forestales.ujed.mx/es/oferta_educativa_icf_perfil_ingreso.php
- Data about applicants and admitted students for the past five years in the self-assessment report

Preliminary assessment and analysis of the peers:

The panel members discuss the entrance requirements with the programme leadership in view of the two different admission mechanisms for the fall (Cycle B) and the spring semesters (Cycle A) applied in the past. The regular admission for the cycle B is taking place in the fall through the means of the so-called CENEVAL exam, carried out nationwide. This exam include testing competences in mathematical and analytical thinking as well as communicative competences in Spanish and English.

The university defines the minimum score to be acquired within this exam. In case students did not achieve the defined minimum score in the past, they had the option to enter a propaedeutic cycle/ preparatory semester to compensate the lack of knowledge in some area, subsequently entering the programme in the following spring semester. This system was dysfunctional in the sense that the dropout rates of this group of students was exceedingly high. Consequently, the faculty stopped the propaedeutic cycle system as of 2016. Since then, dropout rates have been reduced significantly, which is to be commended.

Additionally, there is a second admission system for the cycle A in place for the spring semester which has been devised by the Forestry Science faculty and UJED. Students are recruited after having scored a set minimum in the faculty's own entrance exam in the areas of mathematics, biology and chemistry, in other words the fundamentals of the environmental sciences.

The panel acknowledges that the admission criteria is generally transparent, that the process has been ISO certified and by now is producing satisfactory results.

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

The expert panel considers the criteria treated in this section as *largely fulfilled*. It remains critical with respect to the name of the program.

Name of the program

With a view to the widely absent engineering issues and objectives in this programme (at least in the technical sense of this denomination: cf. “engineering analysis”, “engineering design” and “engineering practice”) on the one hand and its primordial scientific focus on the other, the name of the programme seems rarely fitting. The experts conclude that the programme name needs to be shifted according to its essential focus or, otherwise, the concrete meaning of the “Engineering” term must be clearly indicated (see below, Section F, A1.).

Description of learning units/modules or module handbook

The expert panel is grateful for the submission of a revised and shortened handbook. On a first glance, the revised edition confers substantial information about the intended learning results of students in each module and of the contribution of the individual learning units/modules to the overall qualification objectives stated above (columns “Professional competences” and “General purpose of the course” of the revised module handbook). Although it appears at times, that learning outcomes are blended with the description of the contents, there is a clear alignment of the module learning outcomes to the overall objectives of the program. Along with an abbreviated presentation of the module content, the peers are now able to assess in how far the learning outcomes and contents do correspond to each other and fit into the program’s overall objectives. In principle, they answer this question in the affirmative. This result renders superfluous a formulated requirement to that end.

2. The degree programme: structures, methods and implementation

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|--|
| Criterion 2.1 Structure and modules |
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Evidence:

- Module (learning unit) descriptions available on the website
- Learning units matrix
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The curricular structure is referred to and depicted as map in the first part of this report. It is divided into so-called “Learning Units” which are subdivided into “modules”.

In the first two semesters, “**basic training**” is instilled. It consists of those areas of knowledge, skills and attitudes which all graduates from Universidad Juárez del Estado de Durango (UJED) must have and they are vested in the following **Learning Units**: computing, critical and creative thinking abilities, reading and writing, environmental education, chemistry, mathematics, physics, earth sciences, research methodology, ecology, biochemistry and statistical methods. These basic modules correspond to 23% of the total credits.

This is followed by the so-called “**disciplinary training**” components of the curriculum. In the words of the UJED “education model” this part is described as follows: “this area can also be named professionalizing and it refers to the acquisition of knowledge, abilities, skills and attitudes which allow the student to manage language, methods, technics and advances of the disciplines that base the future of his professional tasks... They constitute the minimum learning that each professional should have regarding the management of the disciplines involved in a career training”. The **corresponding learning units** are digital cartography, geographic information system, ecological management, territorial management, environmental impact assessment, environmental biology, microbiology, environmental genetics, resources sustainability, wildlife areas management, health and environment, green areas design, contaminant processes management, environmental systems, ecology, environmental regulations, environmental audit, environmental management, environmental economy, biotechnology, environmental toxicology, solid waste management, hazardous waste management, soils bioremediation, statistical sampling, air contamination, soil contamination, natural risks management, thermodynamics, physio chemistry, instrumental analysis, water contamination and quality and water treatment. Overall, this “disciplinary component” amounts to around 50% of the total work load.

During the last stage of the program, the “**terminal training**” kicks in, contributing around 20% of the credits and aiming at deepening the knowledge in specific areas of interest to the students. Here the following list of electives are concentrated.

Electives

| Block 1 Humanities areas | Block 2 Engineering area |
|--|---|
| Environmental policies | Ecotechnologies |
| Natural resources sustainable management | Design and development of ecotechnological projects |
| Environmental services | Sustainable energies |
| Regional socioeconomically assessment | Integral management of urban solid waste |

| | |
|--|---|
| Strategies for the global warming | Environmental technological innovation |
| Design and assessment of environmental | Integral management of contaminating agents |

In the last stage of the programme, the so-called **Receptor Units** are concentrated. Here students engage in research seminars and projects, in the **professional residence** (internship in companies and governmental units) as well as the **receptional experience** (the Bachelor exam, which can consist of the writing of a formal thesis or a report about the professional residence), see below.

While from an overall perspective the structure of the curriculum is in line with expectations, there are a number of elements, which are of concern and consequently need attention:

On the one hand, it has become very clear during the discussions that the system of electives, as it is structured right now, is not adequate. Currently the available modules are split into two blocks being labelled “humanities area” and “engineering area” respectively. The peers find that there is little if no choice as these electives are a formal part of the curriculum in its 7th semester. Some of those listed are even not really in offer, as the responsible part time staff is not available and they are offered too late in the study program to allow for personalized learning paths and individual specializations. In addition, it is not possible to take courses from other fields of study within the university. The peers also see a demand for a number of courses, which are not solely vested in the technical and environmental field that is the social-economic realm such as rural sociology and rural development, project management, communication and extension, etc. to foster the capacity of socio-economic assessment.

Overall, the panel therefore concludes that it would be valuable to allow for greater flexibility by offering more electives, so that students can develop an individual focus in line with their interests and capabilities. The peers learn that the faculty and its staff are aware of this shortcoming and are working on new models to develop a more suitable system of electives for the study programme under review.

On the other hand, the practical elements in the study program need further attention. Students during the audit expressed a strong wish to be exposed to more practical applications of the conveyed theory, citing an increase of the number of field study trips and more practical work/and experiments in the laboratories among the options. The practical placement, the so-called professional residence, is a valuable component well positioned within

the curriculum to that regard. It is typically connected to the development of the final thesis. The number of available places however is rather limited and not always gives the students the professional exposure they need to be successful in their future careers.

As to the system of the above cited “receptional experience” (another term for “thesis requirements”), so far there are essentially two ways to obtain the degree. One is the compilation of a report about the outcomes of the professional residence, the other one the writing a formal Bachelor thesis. As of today most of UJED students opt for the first option by choosing a topic which emanates from their experiences during their internship. The peers are in favour of establishing a system of a formal thesis, not least because the faculty envisages postgraduate offers in this field of study and entertains laboratories, which could be used to a fuller potential. The stakeholder from industry strongly support this finding.

Furthermore, English language education is a concern. Students (as well as staff) expressed a strong demand that this element is strengthened. This also would be in line with the self-defined programme learning outcomes, which list the mastery of two languages, and with the Strategic Plan of the faculty, which foresees more offers in altogether (even) three languages.

With regard to international mobility, while this is principally possible within the programme structure, the number of outgoing students is currently relatively low. For accessing the UJED mobility programme, the environmental management engineering students has to be not delayed in his students, and have a minimum average of 8.5 for international, 8 for national mobility as average score in his studies. In addition, he must demonstrate certification of the B1 level of English (see above).

There is currently no plan to increase the number of enrolled international students.

Criterion 2.2 Workload and credits

Evidence:

- Module (learning unit) descriptions available on the website
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel discusses the credit point system in use and its comparison to the European credit system ECTS. The so-called Academic Credits Allocation and Transference System (SATCA/ACATS) is principally also based on student workload. In order to obtain the Bachelor degree in environmental management engineering, graduates need to gather overall 302 ACATS credits. These working hours includes all types of student learning, both within and outside of the classroom. Furthermore, the panel notes that credit points were

awarded not only for the taught modules, internships and for the social service but that students could upon request also receive credits for activities such as participating in a congress or forum or meeting with an advisor.

As to the recognition of externally acquired achievements, the panel notes that university-wide regulations are in place (<http://movilidad.ujed.mx/convocatorias>). This renders transition between higher education institutions possible, though it was noted that corresponding requests are rarely received. The discussions with those few students with an international learning experience confirm that the recognition of credits obtained at international institutions is implemented without problems.

Different calculations of credits and translation in the ECTS are used depending on the type of student work. The panel notes positively the significant reduction in the number of drop-outs and the fact that most students, especially since the adjustments being made in the admission system (see above) as of 2016 are able to complete the programme in the foreseen standard period of study.

In the discussions, the panel learned that a continuous process of asserting the workload of different learning units/modules still needs to be fine-tuned and, where necessary, corresponding adjustments to be made.

Criterion 2.3 Teaching methodology

Evidence:

- Self-assessment report and discussions during onsite visit
- Module (learning unit) descriptions available on the website

Preliminary assessment and analysis of the peers:

During the audit, the staff of the faculty refers to the Educational Model of UJED which centres its attention on achieving the desired learning outcomes of the programme under review. The panel considers the teaching methods in use to be generally adequate. In particular, they make positive note of the group work and projects incorporated into some of the modules.

Students, while generally expressing a general satisfaction with their teachers and their teaching aptitude, nevertheless expressed an interest to strengthen the practical elements in their study such as field trips, practical work in the laboratories, and a better integration applied research in their studies. They at the same time were asking to strengthen the scientific base of their studies.

Not all staff are able to apply the entire range of suitable didactical instruments. There is generally a wish on the part of practically all staff for professional development courses on

all levels (didactics, foreign language education etc.) In the absence of a didactics department at the faculty or university level, the university has chosen the instrument of the external “Teaching Professional Development Program” (PRODEP) which 66% of the PTCs have successfully passed. This is certainly a step in the right direction. Overall it is nevertheless recommended to invest further in the professional development of the teaching staff as a whole not least in view of the faculties’ aspirations to develop postgraduate study programs in the field and to make best use of the available research facilities/laboratories.

Criterion 2.4 Support and assistance

Evidence:

- Self-assessment report
- Discussion during the onsite visit

Preliminary assessment and analysis of the peers:

During the discussion with students and teaching staff, it has become apparent that overall students generally appreciate the support and assistance provided to them and the peers commend the faculty for the efficiency of its so-called Advisory Action Program (PAT). Each student commencing the study program is assigned a staff member at the outset of his/her studies, who provides personal mentoring and monitors study progress. During the course of altogether 9 semesters, there are 20 formal encounters between the student and his/her tutor, the results of which are sometimes protocolled. This is particularly the case in circumstances where problems have been identified and corrective action has to be undertaken. In other cases minutes of these encounters only now start to be taken and the peers encourage the faculty members to further strengthen this system and establish it as best practice.

Apart from the personal mentoring system, for each incoming cohort, one of the staff members is appointed as “class advisor” who has the responsibility to monitor attainment of the educational goals for the entire cohort.

Students also confirm that support was provided for participating in national or international exchange activities. While the number of involved students is still rather low, the availability of support is appreciated.

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

The expert panel concludes that the requirements of the criteria in this section have been *broadly, but not yet fully met*. The comment of the University does not address this issue,

thus leaving the peers preliminary observations, critics and recommendations largely unaltered.

Catalogue of Electives / Options for developing an individual focus

Regarding the options to develop an individual disciplinary focus, the expert panel nevertheless sees the necessity to improve the concept of the programme, as is pointed out in more detail in its preliminary assessment (see below, Section F, A. 2.).

Practical components of the curriculum

There are already major practical elements meaningful integrated in the curriculum, as for instance laboratory units and the so-called professional residence. As the peers observed during the onsite-visit, students overwhelmingly expressed their favour for additional practical experience during their studies. This leads the peers to proposing a respective recommendation (see below, Section F, E 1.).

Workload evaluation resp. adaption of credit point allocation or content of learning units/modules

The expert panel acknowledges that the university take pains to implement a more fine-tuned system of workload-evaluation in order to be aware of the students' actual workload and able to adapt the learning units or the credit point allocation accordingly. It confirms a recommendation to this end (see below, Section F, E 2.).

Report about Professional Residence or Final Thesis

Cf. final assessment to the following criterion 3 (examination system).

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Module (learning unit) descriptions available on the website
- General Exams Regulations
- Regulation on professional thesis, Professional Residence regulation, Degree Regulation, Professional Examination Regulation, Complementary regulation for field practices; all regulations available on website:
http://forestales.ujed.mx/es/acerca_facultad_normatividad.php
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The panel members note that the modules made use of a so-called formative exam system which consists of continuous evaluations during the semester. In case students achieve a minimum score of 8.5 (out of 10) and have participated in at least 80 % of classes, they are exempt from the final exam. The types of these continuous evaluations are decided by each teaching staff member individually and typically include different forms such as tests, projects, reports, homework etc. Additionally, two or three exams can be set per semester.

As to the level of the exams, the experts did not have a possibility to have a thorough check through a sample of exams and tests and thus could not assess whether sufficient competences in line with the defined learning outcomes are demonstrated. Access to the internal moodle platform would allow them to check this more thoroughly.

As to the administration of the exams, they are announced in time, resits are being offered in a timely manner, there are also disability compensation regulations for handicapped students. In the discussion with students the experts noted no major problems. A system of external examiners, currently not in place, could provide further valuable insight into the level of student achievements in the programme.

Concerning the final exam, the panel understands that it can be executed via a project report about the professional residence or as result of a thesis. When the experts were checking the results of these two types of exams for the predecessor programme (in the absence of samples for the programme, which started only in fall of 2014) they did not see an obvious difference in the quality or level between the two. They understand that more than 80% of students chose the report because it appears to be administratively easier to arrange and provides the attraction of a different working environment. However, the panel believes that a research project and thesis provides another level of training and stimulus and that a mandatory final thesis is considered good practice internationally. They are supported in this view by stakeholders from Mexican industry.

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

The expert panel considers the demands of the criteria dealt with in this section to be *generally fulfilled*. Thus, the preliminary assessment and conclusions of the panel is confirmed for the most part.

Level of the learning achievements / inspection of module examinations

Up to now, the peers' request for samples of exams (which could not be organized during the course of the onsite-visit) has not been answered adequately, apparently due to a misunderstanding of the request on the university's part. If it turns out to be impossible to get access to these samples on short notice, the peers will opt for an additional requirement urging the university to provide evidence that the exams aptly demonstrate the students' learning achievements on the Bachelor's level.

Report about Professional Residence or Final Thesis

The expert panel has already stated that it considers the two pathways of a concluding graduate work (project report or (Bachelor) thesis) as practically equivalent concerning its respective outcomes. Nevertheless, the peers favour a thesis with regard not only to the scientific stimulus it spurs but also to good internal practice. A recommendation to this end should foster the industrial stakeholders' support for the thesis (see below, Section F, E 3.).

4. Resources

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| Criterion 4.1 Staff |
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Evidence:

- CVs of staff members
- Information about research projects
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

During the audit, the panel learns that altogether 47 staff members support the Bachelor study program in environmental management engineering, though at the time of the audit it proved to be not feasible to get an exact number for the program's full time teaching equivalents (FTE) and student-teacher ratio from central administration sources.

Among the 47, 12 are reported to be full time staff members whereas the remaining 35 employed in different part time positions with varying teaching assignments on a weekly or monthly basis. This group of part-timers is on average providing a viable connection to industry and thus are able to bring in valuable practical experiences from the working environment. At the same time, they usually have other job commitments outside the university, which makes their accessibility to students at times a challenge and the prospective semester planning for the dean/program coordinators more difficult. The program at this

stage practically does not profit from contributions of visiting professors, a fact which students lament. Overall, the panel sees value in increasing the number of full time staff to establish a better balance and consistency in teaching resources while at the same time promoting research activities at the faculty (see below). They also are in favour of having a programme of visiting lecturers stimulating student interests and opening new learning horizons.

As to underlying academic qualifications on which the program can draw, 85% of the staff according to the information provided dispose of a postgraduate degree (divided almost equally between Master and Ph.D qualifications), whereas 15% have Bachelor level academic credentials. As common understanding warrants that the qualification level of the teachers should be at least one level above those who they teach, an upgrade for this group should be one of the priorities.

In the discussions with the university leadership, the peers gain the impression that in the recent past recruitment policies have been professionalized and that specific qualification profiles and research are specifically targeted in an attempt to recruit the most suitable staff. Similarly, the peers take positive note of the fact that an incentive system for good teaching and research is in place as this forms part of their remuneration/salary packages of staff.

Notwithstanding the areas of improvement mentioned above, there is well documented evidence that the overall satisfaction rate related to the quality of teaching and teachers is high as demonstrated through regular student feedback for which the faculty and the program is to be commended. There are comparatively few teachers, which are underperforming, and in these circumstances, the deans are having conversations with these staff members to seek improvement. In a worst-case scenario however, sanctions are not really working in the Mexican system of higher education due to the strong position of unions, which makes a replacement or punitive/corrective actions difficult to execute.

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| Criterion 4.2 Staff development |
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Evidence:

- Self-assessment report
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The staff handbook provided as part of the SAR provides further evidence of the individual qualifications of the teaching staff. The peers observe that research and publication records are frequently not very prominent, especially among those who are in part time positions.

Those in full time staff on the other hand profit from the possibility to take every 5 years one year of a sabbatical during which they can upgrade their research capacities.

The number of staff members who are members of the national system of research (SNI), a peer-reviewed system providing the status of national researcher and access to related funding by the National Council of Science and Technology (CONACYT), is comparatively low and should be improved in the long run. The panel positively acknowledges that staff members receive teaching load reductions for research or administrative activities. At the same time, the university might find other ways to encourage staff members to pursue research rather than relying on their own motivation to become SNI members.

There is generally a wish on the part of practically all staff for professional development courses on all levels (didactics, foreign language education etc.) In the absence of a didactics department at the faculty or university level, the university has chosen the instrument of the so-called “Teaching Professional Development Program” (PRODEP) which 66% of the PTCs have successfully passed.

Overall, it is recommended to invest further in the professional development of the teaching staff as a whole not least in view of the faculties’ aspirations to develop postgraduate study programs in the field and to make best use of the available research facilities/laboratories.

Criterion 4.3 Funds and equipment

Evidence:

- Photographic reports of facilities
- Information about infrastructure on website:
http://forestaes.ujed.mx/es/acerca_infraestructura_galeria.php
- Tour during onsite visit

Preliminary assessment and analysis of the peers:

Sufficient level of funding and diversification of income sources is a challenge for the department and the program under review. Practically all available funding is coming by way of government contributions with little potential to increase this level of funding (international accreditation being one of the few exceptions to the rule). Income from tuition fees is almost negligible, as tuition fees at the (public) university/department are generally low with students frequently coming from disadvantaged population segments. The recruitment of international students for the program has not been and is not on the agenda for the near future.

This leaves third party funding as the only disposable part of the income, which is generated essentially from two separate sources of funding: one being the marketing and selling of continuous professional courses (CPD) for outside clientele, the other one third party funding coming by way of successful applications for public or private research or business tenders. The latter is still comparatively small and is left to the personal initiative of individual staff members, which are requested to provide a certain percentage of overhead on their obtained funding.

The panel consequently suggests professionalizing support structures, so that professors can focus on their core responsibilities while increasing the probability the external tenders are being won. They also recommend looking into funding sources such as projects from abroad (the EU commission projects e.g.).

Concerning the level of technical equipment, the peers visited a number of teaching laboratories, the faculty library as well as other facilities in the course of the onsite review. While the overall quality of the equipment is seen fit for purpose, they identify the need to strengthen some of the learning in basic sciences including botany (lack even of a forest herbarium), zoology, soils, climate and hydrology. There is need for an upgrade in equipment that allows for performing studies to the molecular level in order to increase the methodological capabilities and to enhance practical work. It is especially recommended to have available agarose gel electrophoresis apparatus in sufficient numbers (currently there is none available). Also, Polymerase chain reaction equipment is needed to check organisms for containing foreign DNA and for other genetic manipulations.

The peers recognize the value of cooperation agreements with other higher education institutions in Durango, especially for access to specialised equipment, including the Instituto Politecnico Nacional and the Tecnologico de Durango. The department should make sure that students can easily access equipment (e.g. GIS lab) for conducting their M.Sc. thesis research.

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

The expert panel considers the demands of the criteria treated in this section to be *generally fulfilled*.

Information of the Full Time Teaching Equivalents (FTE)

In its comments, the university plainly declares that the teaching load of full-time teachers' amounts only to a low 25% of the total teaching hours required in the program, leaving a voluminous 75% of the teaching obligations covered by part-timers of different kind. This confirms the expert panel's impression of a significant imbalance within the teaching staff

followed by possibly unfavourable side effects. The peers strongly advise the program coordinators to work for a more balanced staff composition in the medium and long run (see below, Section F, E 4.).

Third party funding

Given the extraordinary important role of third party funding for the operation and further development of the program as well as for the enhancement of the research capabilities (research activities of staff members and infrastructure), the peers strongly subscribe to their preliminary conclusion and proposed recommendation (see below, Section F, E 5.).

Laboratory Equipment

As specified in detail in the above-cited preliminary assessment, the expert panel considers an enlargement in the material base of the program a wishful medium- and long-term improvement (see below, Section F, E 6.).

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- The module descriptions are available on the website in Spanish and in English language: http://forestaes.ujed.mx/es/oferta_educativa/icf_mapa_curricular.php

Preliminary assessment and analysis of the peers:

As annex to the Self Assessment Report the peers were provided with a module handbook of more than 300 pages. In spite this extensive amount of information and after intensive study of its content and discussions with staff members the peers are not in a position to evaluate the concise learning outcomes of the individual learning units and underlying module structures. They also cannot make a judgement to which extent individual modules/learning units support the overarching program learning outcomes. Without these important pieces of information the peers are also not in a position to make a judgement related to the qualification level of the overall program, all the more as they also could not check a sample of exams being given at the end of the modules.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample of degree certificate
- Sample of professional examination act

- Sample of student academic record (*kardex*)

Preliminary assessment and analysis of the peers:

In prior accreditation visits the absence of a Diploma supplement providing information about the student's qualifications profile, individual performance, classification of the degree programme within the educational system, grading system and statistical data on the final grade) etc. was critically noted. In an appendix to the SAR, an example for a DS has now been provided, being issued in Spanish as well as the English language. As there are as of now graduates in the programme the actual use of the DS has not been operationalized.

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| Criterion 5.3 Relevant rules |
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Evidence:

- Rules and regulations published on website:
http://forestales.ujed.mx/es/acerca_facultad_normatividad.php

Preliminary assessment and analysis of the peers:

The panel members positively acknowledge that all rules and regulations defining the rights and duties of university and students and governing the student life within the programme and the institution are publicly available on the website.

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

The panel members conclude that the demands of the criteria covered in this section are *appropriately fulfilled*.

Thereby they acknowledge that the request for submission of a revised module handbook has been adequately answered by the university.

6. Quality management: quality assessment and development

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| Criterion 6 Quality management: quality assessment and development |
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Evidence:

- Quality and teaching model available on the university website:
http://planeacion.ujed.mx/Publico/PE_ModeloEducativo.aspx

- Regulations for internal Planning and Institutional Evaluation: <http://forestales.ujed.mx/es/pdf/Reglamento%20de%20Planeacion%20y%20Evaluacion%20Interna.pdf>
- Self-assessment report including data about student numbers, student progress
- Analysis of graduates survey
- Discussions during onsite visit

Preliminary assessment and analysis of the peers:

The peers acknowledge that an extensive quality assurance system is in place on the university and department level, extending as well to the programme under review.

They commend the faculty for the fact, that a considerable number of services offered by the faculty, such as the tutoring, social services and controlling, are ISO certified. In addition the programs monitors its performance by conducting a considerable number of surveys in terms of student's satisfaction covering practically all aspects of student life, including the teaching performance, overall satisfaction with the programmes (most students would study the program again), support services, maintenance of buildings etc. The results of these surveys are aggregated each year in a report to the university leadership. They also feed into the execution of a strategic development plan for the department and the programme.

The panel acknowledges that considerable efforts are invested in these quality assurance instruments (with acceptable return rates). Still, it sees room for improvement in the following areas:

In spite of the fact that enormous quantities of data are being assembled more efforts should be invested into delineating suitable corrective action patterns out of them.

Feedback loops are frequently not closed in the sense that those providing feedback for improvement are not getting any response concerning their observations and suggestions.

It is also recommended to establish a permanent industrial advisory committee to put university-industry ties on a more reliable and fruitful basis, supplementing the annual meetings with representatives of industry stakeholders.

An alumni database for the graduates of the programme will be needed once the first batch will finish its studies.

Finally, the strategic development plan as of now merits further refinement as key performance indicators, corresponding timetables and persons in charge need to be more clearly defined.

As the programme at this very moment about to undergo an extensive revision, it is a very good moment to implement these recommendations and modernize the internal QA instruments.

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

The expert panel acknowledges the viable efforts of the university in assuring the quality of its educational programs. Nevertheless, as stressed and argued in more detail above, the experts advise the program coordinators to continue developing the quality assurance system. In the end, this should lead to the establishment of a quality culture and quality processes, which ensure that the results generated through quality assurance measures, are routinely used for the further improvement of the study programs. A respective recommendation is meant to support these efforts (see below, Section F, E 7.).

D Additional Documents

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

- D1. The panel requests more information in order to infer how the individual learning units/module contribute to the programme learning outcomes and competence profiles. While the individual module descriptions follow a uniform scheme and provide extensive formal information, they do not allow inferring what is really being taught in the individual modules and on what level/which depth knowledge, skills, competences and values are acquired. A revised Learning Unit/Module handbook should give answers to these questions.
- D2. Access to the Moodle Platform should be provided so that the panel can have access to samples of exams for different modules.
- D3. Calculation of the Full Time Teaching Equivalents (FTE) should be presented.

E Comment of the Higher Education Institution (14.07.2018)

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

- Revised Learning Units Handbook

F Summary: Peer recommendations (17.09.2018)

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

| Degree Programme | ASIIN-seal | Subject-specific label | Maximum duration of accreditation |
|---|--------------------------------|------------------------|-----------------------------------|
| Ba Environmental Management Engineering | With requirements for one year | n/a | 30.09.2024 |

Requirements

- A 1. (ASIIN 1.2) The particular meaning of the “Engineering” term in the programme name has to be clarified in order to avoid misconceptions of the programme’s content.
- A 2. (ASIIN 2.1) The system of electives is to be revised and adapted so that students can develop an individual focus in the curriculum.

Recommendations

- E 1. (ASIIN 2.1) It is recommended to foster practical elements in the study programme as well as foreign language education.
- E 2. (ASIIN 2.2) It is recommended to introduce more permanent mechanisms for adjusting workload calculations of modules.
- E 3. (ASIIN 3, 2.1) It is recommended to establish a system of a final thesis or equivalent that guarantees that students can carry out an assigned task independently and at the level of the qualification sought.
- E 4. (ASIIN 4.1) It is recommended to have a more balanced staff composition and to invest into upgrading academic qualifications and CPD of staff.
- E 5. (ASIIN 4.3) It is recommended to strengthen the support structures for third party funding and to more actively encourage teaching staff to pursue research projects.
- E 6. (ASIIN 4.3) It is recommended to increase the resources of the laboratories as specified in the report.

- E 7. (ASIIN 6) It is recommended to further target quality assurance measures in order to ensure that results of evaluations are used to continuously improve the study program and to close feedback loops with stakeholders.

G Comment of the Technical Committee 08 – Agriculture, Nutritional Sciences and Landscape Architecture (17.09.2018)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure. It agrees with the resolution recommended by the peer panel without proposing any changes.

The Technical Committee recommends the award of the seal as follows:

| Degree Programme | ASIIN-seal | Subject-specific label | Maximum duration of accreditation |
|---|--------------------------------|-------------------------------|--|
| Ba Environmental Management Engineering | With requirements for one year | n/a | 30.09.2024 |

H Decision of the Accreditation Commission (28.09.2018)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission for Degree Programmes discusses the procedure and agrees with the recommended resolution of the peers and the Technical Committee without changes.

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

| Degree Programme | ASIIN-seal | Subject-specific label | Maximum duration of accreditation |
|---|--------------------------------|------------------------|-----------------------------------|
| Ba Environmental Management Engineering | With requirements for one year | n/a | 30.09.2024 |

Requirements

- A 1. (ASIIN 1.2) The particular meaning of the “Engineering” term in the programme name has to be clarified in order to avoid misconceptions of the programme’s content.
- A 2. (ASIIN 2.1) The system of electives is to be revised and adapted so that students can develop an individual focus in the curriculum.

Recommendations

- E 1. (ASIIN 2.1) It is recommended to foster practical elements in the study programme as well as foreign language education.
- E 2. (ASIIN 2.2) It is recommended to introduce more permanent mechanisms for adjusting workload calculations of modules.
- E 3. (ASIIN 3, 2.1) It is recommended to establish a system of a final thesis or equivalent that guarantees that students can carry out an assigned task independently and at the level of the qualification sought.
- E 4. (ASIIN 4.1) It is recommended to have a more balanced staff composition and to invest into upgrading academic qualifications and CPD of staff.

- E 5. (ASIIN 4.3) It is recommended to strengthen the support structures for third party funding and to more actively encourage teaching staff to pursue research projects.
- E 6. (ASIIN 4.3) It is recommended to increase the resources of the laboratories as specified in the report.
- E 7. (ASIIN 6) It is recommended to further target quality assurance measures in order to ensure that results of evaluations are used to continuously improve the study program and to close feedback loops with stakeholders.

I Fulfilment of Requirements (20.09.2019)

Comments of the peers and the Technical Committee 08 – Agriculture, Nutritional Sciences and Landscape Architecture (10.09.2019)

Requirements

- A 1. (ASIIN 1.2) The particular meaning of the “Engineering” term in the programme name has to be clarified in order to avoid misconceptions of the programme’s content.

| Initial Treatment | |
|-------------------|---|
| Peers | Fulfilled Justification: In order to fulfill the requirement and to avoid misconceptions, the faculty provides sufficient information that justifies the engineering name in its peculiar sense. Still, it could be highlighted that students gain engineering knowledge and skills <i>with a clear focus on environmental management</i> (as topics like mathematics, physical chemistry, digital cartography, computing etc. suggest). |
| TC 08 | fulfilled Justification: The Technical committee follows the assessment of the peers. |

- A 2. (ASIIN 2.1) The system of electives is to be revised and adapted so that students can develop an individual focus in the curriculum.

| Initial Treatment | |
|-------------------|--|
| Peers | fulfilled Justification: There are a now a number of electives implemented in the study programme. In addition, efforts are undertaken to even intensify the issue as there is a restructuring programme and committee installed. |
| TC 08 | fulfilled Justification: The Technical committee follows the assessment of the peers. |

Decision of the Accreditation Committee (20.09.2019)

The Accreditation Commission decides to prolong the award of the seal as follows:

| Degree Programme | ASIIN-seal | Subject-specific label | Maximum duration of accreditation |
|---|----------------------------|-------------------------------|--|
| Ba Environmental Management Engineering | All requirements fulfilled | n/a | 30.09.2024 |