ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Energy and Power Engineering (Thermal Energy Engineering & Building Environment and Energy Application Engineering)

Provided by
Shanghai University of Engineering Science (SUES)

Version: 08 December 2023

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
能源与动力工程	Energy and Power Engineering (Thermal Energy Engineering & Building Environment and Energy Application Engineering)	ASIIN	–	02, 01
Date of the contract: 21.05.2019 **Submission of the final version of the self-assessment report:** 22.01.2021 **Date of the onsite visit:** 24.-26.03.2021 **At:** Due to continuing travel and safety restrictions caused by the Covid-19 pandemic, the audit was carried out digitally in agreement with the principal decision of the ASIIN Accreditation Commission.				
Peer panel: Prof. Dr. Dirk Dahlhaus, University of Kassel Prof. Dr. Anne Schulz-Beenken, South Westphalia University of Applied Sciences Dipl.-Ing. Bernd Muehe, MLC Consulting Tao Yiran, Student, University of Shanghai for Science and Technology				
Representative of the ASIIN headquarter: Jan Philipp Engelmann				
Responsible decision-making committee: Accreditation Commission				
Criteria used:				

[1] ASIIN Seal for degree programmes.

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 02 - Electrical Engineering/Information Technology.

European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 28.03.2014 Subject-Specific Criteria of Technical Committee 02 - Electrical Engineering/Information Technology as of 09.12.2011 Subject-Specific Criteria of Technical Committee 01 - Mechanical Engineering/Process Engineering as of 09.12.2011	

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
Energy and Power Engineering (Thermal Energy Engineering & Building Environment and Energy Application Engineering)	工学学士 Bachelor of Engineering (B. Eng.)	Thermal Engineering Refrigeration and Air Conditioning Engineering	6	Full time	-	4 years	175 Chinese CPs ~ 242.5 ECTS	Each fall

For the Bachelor's degree programme Energy and Power Engineering the institution has presented the following profile in the self-assessment report:

"The Energy and Power Engineering programme aims at cultivating practice-oriented engineering talents with good personal traits, professional qualities and professional ethics. They shall have strong interpersonal and teamwork skills, solid knowledge of basic theories of natural sciences, and theories and technologies of energy and power engineering. They shall be capable of holistic thinking, engineering reasoning, problem solving and management. They shall also be able to engage in design, management, research, development, implementation, and operation in the field of energy and power engineering. In addition, they shall be familiar with international rules, have a sense of social responsibility, and be innovative and dedicated to their professions.

The Programme consists of two options for talent cultivation. That is, Thermal Engineering focuses on the research, design, installation, operation and management skills of thermal power equipment, energy conservation/emission reduction and new energy utilization. Refrigeration and Air Conditioning Engineering emphasizes on cultivating skills for the research, design, installation, operation and management in the field of refrigeration and air conditioning engineering.

Graduates of over five years shall acquire the following skills:

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

1). Being able to adapt to the technical development of energy and power engineering, with solid knowledge in mathematics, engineering fundamentals, and energy and power engineering; being able to provide solutions to complex engineering projects.

2). Being able to follow cutting-edge technologies in energy and power engineering fields, innovate in engineering, and use modern tools for the design, development and production of products in the field.

3). Having a sense of social responsibility, understanding and adhering to professional ethics, accounting for law, environment and sustainability, and putting public interest first in engineering practices.

4). Maintaining a healthy body and mind, good scientific and humanities literacy, team spirit, effective communication, expression and project management ability.

5). Having an international vision, able to actively adapt to the changing domestic and international situations and environment, and having the ability of independent and lifelong learning."

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Study plan of the degree programme
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The auditors base their assessment on the learning outcomes as detailed in the Self-Assessment Report. They refer to the Subject-Specific Criteria (SSC) of the Technical Committees 01 – Mechanical Engineering/Process Engineering and 02 – Electrical Engineering/Information Technology as a basis for judging whether the intended learning outcomes of the programme as defined by SUES correspond with the competences as outlined by the SSC.

SUES has described objectives and learning outcomes for the programme. While the objectives are developed based on positioning of SUES as a university of applied sciences with a practice-oriented focus and are rather general and concise, the learning outcomes describe in greater detail the competences, which the students should acquire during their studies. As far as the reviewers are able to tell, however, the programme objectives and learning outcomes are published neither on the English nor on the Chinese website. This is necessary for prospective students as well as for other stakeholders.

From the documents presented and the discussions with the representatives of SUES, the peers understand that graduates of the degree programme are supposed to possess solid knowledge in mathematics, natural sciences, and engineering fundamentals. They should be able to use this knowledge to analyse problems in the field of energy and power engineering and to develop adequate solutions using appropriate tools and technologies. Moreover, they should be able to conduct research in this field applying scientific methods for analysing data, simulation and for designing experiments. In their engineering activities,

graduates of the programme are supposed to take into account professional norms as well as the impact on the environment and social structures. They should work independently, communicate clearly and effectively and be aware of the necessity of life-long learning.

In the Diploma Supplement, SUES has laid down markedly different qualification objectives, focussing “on the theory, method, practice and application of energy and power vehicle operation, support, maintenance, fault diagnosis and repair”. The peers are unsure whether this is just a mistake or whether the objectives are not consistently defined. In any case, SUES has to ensure that the qualification objectives as laid down in the different documents are consistent.

The peers agree that SUES has laid out ambitious objectives for the programme. However, they consider the field, in which the students should acquire professional knowledge and skills, not specific enough. On the one hand, this relates to the title of the degree programme that does not correspond to the curriculum (see 1.2 for more details). On the other hand, the programme objectives and learning outcomes as described by SUES do not allow the reviewers to position the programme within the field of the traditional engineering disciplines. Particularly, it remains unclear, whether the programme is intended to belong to electrical or to mechanical engineering or whether it is supposed to combine elements of both disciplines. This leads to further difficulties when assessing the curriculum (see 1.3).

Furthermore, the peers are sceptical about whether the Bachelor’s programme at hand can realistically prepare students “to conduct research on energy and power engineering problems based on scientific principles and methods”. They learn that practical scientific training is included in some courses and that students have the opportunity to participate in research projects of the faculty. Taking into account the programme’s practical focus as well as the necessary limitations of any Bachelor’s programme, the peers nevertheless doubt that graduates of the programme are able to conduct independent scientific research.

During the audit, the peers discuss with students, teachers, and alumni where the graduates can find suitable jobs. They learn that graduates mostly work in engineering companies concerned with air-conditioning or heating, but also in companies producing and providing electric energy. The students are generally satisfied with their job perspectives. According to the Self-Assessment Report, only a small number of graduates acquires a Master’s degree. SUES explains that due to the practical focus of both the programme and the entire university, the Bachelor’s degree is sufficient to find an adequate position in most cases. Nonetheless, the auditors see that there is a rising demand for higher-level qualifications in China, particularly in the field of this programme due to China’s ambitious goals regarding energy efficiency and reducing carbon emission. Therefore, they encourage SUES to

take this into account for their programme objectives and to ensure that graduates of this programme are well-prepared for consecutive Master's programmes.

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Report
- Diploma Supplement
- Discussions during the audit

Preliminary assessment and analysis of the peers:
In the Self-Assessment Report and during the discussions, SUES explains that the title of the degree programme follows the rules for naming study programmes set by the Chinese Ministry of Education. This specifically means that universities cannot pick any name, but have to choose from a given list of titles. Originally, the programme was called "Thermal Engineering", but at some point the name was changed to accommodate new regulations by the Ministry.

The peers learn that while the title is subject to the mentioned regulations, Chinese universities are free to design the curricula of their programmes in accordance with their capabilities and the demands of the job market. While they understand that there are some limitations set by the Ministry, they recognise a clear mismatch between the current title, "Energy and Power Engineering", and the curriculum. To conform to this title, the students would need to acquire additional knowledge in several fields of electrical power engineering, amongst other things (see 1.3 for more details). At the moment, the curriculum holds a much narrower focus than the title suggests, concentrating mainly on various areas of thermal engineering, be it air-conditioning or heating systems.

This mismatch between title and curriculum is potentially misleading prospective students, who might erroneously think that the programme is similar to other programmes of the same name. When redesigning the programme in consideration of the sections 1.1 and 1.3, the peers urge SUES to choose a name that adequately reflects the contents of the programme.

Criterion 1.3 Curriculum

Evidence:

- Study plans of the degree programme

- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The curriculum of the programme consists of modules belonging to nine categories: mathematics and natural sciences, engineering fundamentals, informatics, engineering applications, practical training, bachelor's thesis/capstone project, general courses of humanities and social sciences, foreign language, and elective courses. During the first four semesters, the students lay the foundations for the more advanced courses by mainly acquiring basic knowledge in mathematics, natural sciences, engineering fundamentals, and English. The engineering fundamentals include fluid mechanics as well as thermodynamics, electrical technology and heat transfer.

The fifth to seventh semesters are dedicated to engineering application courses. Here, students can take courses either on air conditioning and refrigeration or on boilers, steam turbines and combustion engines. Furthermore, they can specialise through the choice of electives, which are mainly situated in the areas of air conditioning, refrigeration, and heating. Basic courses in the humanities and social sciences are spread throughout the entire curriculum, as are elements of practical training. The seventh semester, however, features a particular focus on practical training at SUES and off-campus. In the final semester, students write their theses to finish the programme.

The central problem when assessing the curriculum is that the auditors are not able to identify what SUES considers the thematic core of the programme. Judging from the engineering applications' courses and the theses, the focus seems to lie in the design of air-conditioning, refrigeration and heating systems and thus rather in mechanical engineering. In this case, the curriculum would lack crucial aspects such as control systems, demand side management, and smart home solutions. Additionally, knowledge in fluid dynamics (Euler equations, Navier-Stokes equations) would be necessary for the design and optimisation of heat transfer systems, which would further presuppose the ability to solve partial differential equations that is also not taught in the mathematical courses at the moment. Considering SUES's emphasis on energy efficiency and renewable energies in the Self-Assessment-Report as well as in the audit discussions, these issues are all the more important. On the other hand, certain courses that are currently in the curriculum would not be necessary with such a narrow focus.

If the graduates are supposed to be capable of working in broader electrical engineering, as some apparently already do, the curriculum is missing some fundamentals of electrical engineering such as Fourier transformations, linear systems theory, network theory, the functioning of inverters, levelized cost of energy, and the difference between active and

reactive power. Some alumni working in renewable energies confirm that they had to acquire a lot of fundamental knowledge after having finished their studies.

As the proper assessment of the curriculum depends on the fundamental direction and goals of the programme, the peers are currently unable to give their final verdict on this issue.

The auditors are also surprised about the courses in the field of informatics, which are situated in the first three semesters. They start with a course called “Fundamentals of Computer Applications”, in which the students learn to operate basic office software such as Word, Excel and PowerPoint. In the discussions, SUES explains that this first course is meant to build a common basis as not all students arrive at the university with the same level of computer skills. While the peers can principally understand this point, they consider it highly unlikely that a significant portion of freshmen is unable to operate office software. Therefore, they recommend starting these courses at a higher level to have enough time to teach the students programming and data analysis skills with more immediate relevance to their field. The exact content of these should depend on where SUES intends to lay the focus of the programme.

Considering the internationalisation of the Chinese job market as well as of the university, the peers appreciate that English courses are mandatory for all students. They see that there are English courses on three levels spread out over the first three semesters. Additional elective courses are open to interested students. According to the module handbook, the course “Comprehensive College English (2)” in the first semester aims to teach the students to “basically understand English articles on general topics”, amongst other things. Once again, they wonder whether this is an adequate entry level for a Bachelor’s degree programme. In the discussions, they learn that students take an English exam when entering SUES that determines which of the courses they actually have to take to prevent teaching them what they already know. The peers believe that achieving a higher English proficiency would be very beneficial to the students, particularly regarding their job perspectives. Therefore, they encourage SUES to strengthen the students’ English-speaking abilities, for example by starting the courses at a higher level or by offering additional courses. They particularly recommend teaching the students more technical English in order to familiarise them with the technical terms, which they need for their future occupations.

Overall, considering the mentioned discrepancies within the curriculum and in relation to the programme objectives, the peers urge SUES to redesign the programme in such a way as to make sure that the students acquire the competences, which they need for their future occupation as professional engineers or to take up consecutive Master’s programmes. They would like the university to identify these competences and to take them as a starting

point to develop the learning outcomes and the curriculum accordingly in order to achieve a coherent study programme.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Reports
- Website
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The peers understand from the documentation and the discussions that the admission to Bachelor's degree programmes in China is centrally regulated and organised by the government. Graduates of secondary schools take the National Uniform Enrolment Examination (Gaokao). Based on the results, students may choose from subjects at universities distinguished in three categories (40 elite universities, 100 key provincial universities at second level and the rest in the third category of general universities – with SUES as one of them). Candidates are admitted in three batches according to their scores (from highest to lowest). Students apply with their results to those universities open to them and the universities follow their own admission procedure. Those who meet the following conditions can apply for registration: (1) comply with the Constitution and laws of the People's Republic of China; (2) having graduated from a senior secondary education school or have an equivalent education level; (3) physical condition meets relevant requirements. SUES admits candidates according to their college entrance examination score. In general, candidates are admitted to most programmes of SUES in the second batch. However, the admission scores of this study programme reach the level of the first batch in the provinces of Anhui and Henan.

The number of available places in each programme is determined by SUES based on predictions on market demand and has notably risen over the last few years, from around 60 freshmen in 2016 to approximately 90 in 2020. Students in this programme pay a tuition fee of CNY 5,000 (around 630 €) per year. There are several scholarship models for students with outstanding academic performances that cover this fee and that are funded by SUES itself and the municipal government, respectively.

The admission website informs potential students in great detail about the requirements and the necessary steps to apply for admission to the programme. In conclusion, the peers agree that this process is binding and transparent. Through this procedure, it is ensured that only qualified students are admitted to the programme.

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

The peers recognise that the qualification objectives in the Diploma Supplement have been revised and brought in line with the other documents.

They appreciate that SUES is planning to redesign the curriculum of the programme, but emphasise that this has to be done in a systematic fashion, starting from the learning outcomes, in order to develop a coherent degree programme. Moreover, the name of the degree programme, the learning outcomes, and the content have to correspond with each other.

The peers consider criterion 1 not fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Assessment Report
- Study plan of the degree programme
- Module descriptions
- Objective-Modules-Matrix
- "Interim Regulations on the Management of Students' Overseas Exchange by Going abroad of Shanghai University of Engineering Science"
- Discussions during the audit

Preliminary assessment and analysis of the peers:

The degree programme is offered by the School of Mechanical and Automotive Engineering of Shanghai University of Engineering Science. It is designed for 4 years and the students need to achieve 175 Chinese credits. Depending on their skills and on the workload they can handle, students can theoretically finish the programme in three years, while the maximum period of study is six years. Each semester is equivalent to 15 weeks of learning activities. Besides these learning activities, there is one week for midterm exams and one week for final exams.

After analysing the module descriptions and the study plan, the peers confirm that the degree programme is divided into modules, and that each module consists of a sum of coherent teaching and learning units. The module structure follows the nine categories of courses mentioned above and translates them into individual courses. Thus, the problems regarding the structure of the programme and the content of the courses (see 1.1 and 1.3) reappear here, making it impossible to give a sound judgment on whether the module structure ensures that the learning outcomes are attained.

Furthermore, the peers have difficulties understanding the module structures of the degree programme, especially with allocating compulsory and elective disciplines. The peers understand that the programme can be studied in one of two trajectories: “Thermal Engineering” or “Refrigeration and Air Conditioning Engineering”. In the study plan, there are two options for the modules in “Engineering Applications” as well as for the “Electives”. It is not made clear whether these options are independent of each other and if so, to which modules the trajectories refer. In addition, neither the curriculum nor the module descriptions clearly denote which modules belong to which options, especially regarding the modules “Heating Engineering” and “Heat Pump Technology”. It also appears as if the options for the electives feature a different number of modules and a different amount of credits. Here, the peers ask SUES to provide study plans and module descriptions that clearly disclose which modules belong to which category.

Nonetheless, the peers are able to give their opinion on structural issues, which are not directly related to the programme contents. They understand from the documentation and the discussions that there are sufficient practical elements in the curriculum, ranging from basic physics experiments in the first semesters to the more advanced modules “Professional Practice” and “Graduation Practice” in semester 7. The latter both include practical training in laboratories on campus and in local companies, where the students learn to apply the technologies they were familiarised with in the theoretical courses. The students’ academic tutors oversee the company practice to guarantee its relevance for the learning objectives of the programme. Apart from these mandatory modules, the students report that most of them already conduct internships at companies in the summer holidays of the first and second year, encouraged by the faculty.

The peers appreciate the involvement of local companies in the practical training elements and inquire how this cooperation affects the thesis projects. They learn that the topics are typically suggested by the students’ academic tutors, who will then act as principal supervisors. The students are also able to suggest a topic according to their interests. Some of the topics arise out of the cooperation with a company and in these cases, the students will partially work on their theses in the respective company. However, as the peers understand it, most of the theses are done at SUES with no involvement of a local company. They regard

the thesis project as a good opportunity to prepare the students for their future professional occupation and at the same time to further strengthen the university's cooperation with local companies. Therefore, they recommend involving them to a greater degree.

In this context, the peers ask about how the students are taught literature and database research in preparation for the Bachelor's thesis and learn that the course "Information Retrieval" in the first semester teaches them how to search for information in literature and databases. Furthermore, the tutors will help them to find the relevant literature for their projects. The peers consider these mechanisms helpful, although institutional access to international literature and databases seems to be an issue (see 4.3).

The students can define an individual study focus through their choice of engineering application courses (air conditioning and refrigeration or boilers, steam turbines and combustion engines) and through their choice of electives, which are mainly situated in the areas of air conditioning, refrigeration, and heating. They appear satisfied with these possibilities and the peers consider them useful for the students to follow their interests and their career aspirations. As has been mentioned, the documents are not clear about which modules belong to which of the different options.

International Mobility

The peers learn that SUES provides some opportunities for students to conduct internships and exchange programmes abroad. Students who would like to go abroad can make use of cooperation agreements with ten international partner institutions of the School of Mechanical and Automotive Engineering, although the university provided no information on how many of them offer suitable degree programmes for students of Energy and Power Engineering.

SUES has defined formal rules for the recognition of achievements from other higher education institutions, particularly to facilitate (international) student exchange. Credits awarded for courses similar to courses required for the programme are recognised and the grades are converted. Students who want to go abroad shall make a learning agreement with SUES beforehand, providing a list of the courses they will take to guarantee that these are eligible for recognition in the programme.

Despite these efforts, student mobility in the programme under review appears to be relatively low. The students confirm that they are sufficiently informed about the opportunities and that their tutors and other professors encourage them to go abroad. There are also offers for financial support. The peers therefore suspect that the low degree of international mobility may be due to a lack of English proficiency and encourage SUES to expand

its English courses (see 1.3). Depending on how many of the international partner institutions offer modules with relevance for this programme, expanding international cooperation could also prove useful to strengthen student mobility. They emphasise that it is very useful for students to spend some time abroad already during their Bachelor's studies to improve their English proficiency, to get to know other educational systems, and to enhance their job opportunities.

In summary, the peers appreciate the effort to foster international mobility and support SUES in further pursuing this path. However, the academic mobility is still low and there is room for improvement.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- Study plan of the degree programme including Chinese and ECTS credits
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The degree programme under review utilises the Chinese credit system. For theoretical courses, 16 contact hours correspond to one credit. For practical training courses, one credits equals 30 contact hours. Overall, students have to acquire 175 credits to successfully finish the programme. The details and the students' total workload are described in the module handbook. The peers acknowledge that a credit point system based on the students' workload is in place.

SUES also specifies the amount of ECTS credits for each module based on contact hours as well as self-study hours. The peers understand that there can be no fixed conversion rate between Chinese and ECTS credits, since the number of hours per Chinese credit depends on the type of activity and since self-study time is not included. However, a conversion can be done for each individual module based on the total workload given in the module descriptions. On this basis, the programme's total workload equals approximately. 242.5 ECTS credits.

According to the study plan, the students' workload is spread evenly over the course of the programme with each semester featuring between 29.5 and 31 ECTS credits. The students confirm that the general workload is adequate and that they have enough time for their self-study. According to the statistics provided by SUES, around 77 % of students manage to finish their studies in the regular duration of four years. The drop-out rate is almost zero.

The few students who drop out do this due to personal reasons or change the university. This corroborates the peers' impression that the general workload of the programme is adequate, structural peaks are avoided and the students can realistically finish in time.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Report
- Module descriptions
- Discussions during the audit

Preliminary assessment and analysis of the peers:
According to the Self-Assessment Report and the module descriptions, fundamental courses are taught in large classes of about 80 students, whereas the classes in practical and applied courses consist of around 40 students. Each course incorporates lessons in class and self-study, often comprising weekly assignments. Some students remark that there are too many large classes with few interactive elements and that having more smaller classes could provide better opportunities for questions and fruitful discussions. From the documents and the discussions, the peers are unable to gather further details about the teaching and learning methods utilised in the programme. They hence ask SUES to provide them with additional information.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Discussions during the audit

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

The undergraduate dean's office is mainly in charge of routine management and support of the undergraduate teaching and training and has subordinate offices for admission, teaching, practical training, etc. On the programme level, two full-time counsellors are responsible for offering practical assistance and help particularly to freshmen to get used to university life, plan their studies and to introduce them to SUES's cultural and sports offers. They also guide them to think about their career aspirations, to choose their courses accordingly and they provide information on potential future employers.

For their academic development, each student is assigned an academic tutor who supports them in their learning process and provides students with suggestions and counselling for their management of the programme. The practical parts of the study programme are supported by an enterprise mentor who encourages students to conduct practical training in companies and to communicate with professional engineers in order to improve their innovation and entrepreneurial capabilities. Enterprise mentors are managers or engineers of qualified companies hired by SUES. The peers inquire whether the students feel sufficiently supported in their choice of courses, particularly when it comes to specialising in air-conditioning and refrigeration or heating. They confirm that the teaching staff provide enough information about the directions and career options and that their academic tutors help them with their choice.

Overall, the peers conclude that SUES has established a comprehensive support system for students, which helps them to achieve the learning outcomes.

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

The peers understand from the revised curriculum that the programme has been divided more clearly into the two trajectories “Thermal Engineering” and “Refrigeration and Air-conditioning Engineering”. The different modules are now unambiguously assigned to these concentrations.

They appreciate SUES’s intentions to strengthen its cooperation with local industry as well as with international higher education institutions and recommend to pursue these efforts further.

The peers thank SUES for providing additional information on teaching methods. They learn that theoretical courses are mainly taught as lectures supported by various media. They often include demonstrations of case studies and practical assignments so that students learn to apply the acquired knowledge independently. Practical courses are used to conduct experiments or to design systems or equipment in the given field. The peers are altogether satisfied with the elaborations.

They consider criterion 2 fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions
- "Regulations on Course Assessment Management of Shanghai University of Engineering Science"

Preliminary assessment and analysis of the peers:
The examination of the students' achievement of the learning outcomes is conducted according to the university's regulations and the provisions in the module descriptions. Each course has to determine objectives, which support the achievement of the learning outcomes of the respective programme. Accordingly, each course must assess whether all defined learning outcomes stated in the module description have been achieved. For this purpose, SUES utilises various types of examination.

In each course, the final grade is calculated based on students' overall performance during the classes (attendance, assignments), the mid-term exams (if applicable) as well as the final exam at the end of the semester. Where applicable, experiments, internship attendance, and internship reports are also part of the final grade. At the first meeting of a course, the students are informed about what exactly is required to pass the module. The weight of the different factors varies heavily, but on average, the final exam makes up 50-70 % of the final grade in theoretical courses. In most courses, students have to attend 2/3 of the meetings and complete at least 2/3 of the assignments to be able to take the final exam. Course exams are generally scheduled to take place during the final exam week. For some elective courses, the faculty members can determine the time of examination by themselves.

The assessment results are shown by a 100-point system or a 5-class (A, B, C, D, F) 10-grade (A, A-, B+, B, B-, C+, C, C-, D, F) system. A total score of 60 points means passing. Only students with a pass or above can get the corresponding course credit points. If students fail an exam, they can take the resit before the start of the following semester. If they fail that as well, they have to repeat the entire module in the following academic year. There is no limitation as to how often a module can be repeated as long as the maximum study duration of six years has not been reached. If a student cannot participate in the exam due to illness and is able to provide a doctor's certificate, they can take the resit as well. Students can also object to a grade which they deem unfair via their academic tutors.

The peers understand that SUES's examination system relies heavily on written exams and they inquire whether oral exams are used at all and, if so, in which courses. SUES elaborates that except from language courses, there are indeed no oral exams. Presentations make up

part of the class grade in several courses, but they are always supplemented by a written final exam.

The programme comprises a bachelor's thesis in the final semester, which requires students to independently conduct the project work and write the thesis under the guidance of their supervisors. This final project takes 16 weeks and is strictly structured into different phases ranging from literature review to defence of the thesis. There are always at least two supervisors from SUES, regardless of whether the project is conducted in cooperation with a local company or solely at the university. The supervisors do not only grade the thesis itself and its defence, but also the regular progress of the project, which is assessed in biweekly meetings.

Overall, the peers are satisfied with the regulations of exams in the degree programme. They appreciate the transparent procedures set up by SUES and the students confirm that the module requirements and exam dates are indeed communicated to them at the beginning of each semester. The students also emphasise that the grading system is fair and transparent. The peers are able to inspect a sample of examination papers and final theses and are overall satisfied with their quality.

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

The peers thank SUES for clarifying that an oral defence is also part of the "Course Design for Drawing".

They consider criterion 3 fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Staff Handbook
- Discussions during the audit

Preliminary assessment and analysis of the peers:

At SUES, the teaching staff have different academic positions. There are full professors, associate professors, lecturers, and various professional positions. The academic position of each staff member determines their responsibilities in teaching and research and is

based on research activities, publications, academic education, supervision of students, and other supporting activities. 20 full-time faculty members are involved in the programme, including 3 professors, 2 chief senior engineers, 7 associate professors, 2 senior engineers, and 6 lecturers. 18 of them hold a PhD, 2 a Master's degree. Inquiring about the ratio between full professors and other full-time faculty members, the peers learn that this is normal for Chinese study programmes and that many programmes are run by only 2 full professors. Additionally, these numbers do not include the teaching staff for science fundamentals and other courses imported from other faculties, among whom there are also professors. Considering the number of roughly 80 freshmen per year, the peers acknowledge that the lecturer-student ratio appears reasonable.

In this context, the peers ask about how current scientific developments are integrated into the curriculum. Here, SUES emphasises that their traditional focus as a university of applied sciences lies on practical education and that a close connection to the industry is therefore of utmost importance with 14 faculty members having experiences in industry. At the same time, the university has been working on strengthening its scientific character over the last years and already regards it as an important milestone that by now, most lecturers hold a PhD. The peers gather from the CVs that the bulk of the teaching staff is qualified in the current core areas of the programme, that is in heating, ventilation, air-conditioning, and refrigeration. Therefore, they consider the teaching staff well qualified for the programme as it stands. At the same time, this can be regarded as an important constraint for the envisaged redesign of the programme in accordance with the peers' assessment on programme objectives and curriculum.

The students confirm that there is enough staff for administrative and technical purposes. Particularly in the laboratory courses, the ratio between students, faculty members and technicians allows them to properly understand and conduct the experiments.

In summary, the peers confirm that the composition and qualification of the teaching staff are suitable for implementing and sustaining the degree programme in its current form. It remains to be seen, whether potential changes in the programme have any implications for this assessment.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Report
- Staff handbook
- Discussions during the audit

Preliminary assessment and analysis of the peers:
According to the Self-Assessment Report, SUES encourages the continuing professional development of its staff. For this purpose, various opportunities are provided. All new teaching staff have to participate in a training that involves legal aspects, ethics code, pedagogical and psychological knowledge, and professional requirements. Furthermore, the ability of new teaching staff to teach a certain course is evaluated by a panel of senior faculty members through a trial lecture. Depending on the result of this procedure, they can be judged qualified to teach the course independently or only under the guidance of their mentor. Junior faculty members are assigned such a mentor that helps them to draft teaching and learning plans, prepare and give lessons, learn diverse teaching methods and generally develop their teaching competences. The peers consider this system quite helpful to ensure that new faculty members acquire the necessary teaching skills.

To gain further qualification, SUES encourages the teaching staff to spend one year abroad, either as a professional engineer in a company or at a higher education institution. The university aims to establish the model of faculty members who are also professional engineers in order to create a closer connection to industry on a personal level. Besides that, SUES offers opportunities for further education as part of the university-wide Career Development Plan.

The peers generally consider the support mechanisms for staff development adequate. Nonetheless, they advise SUES to offer more opportunities for already established faculty members to develop their professional and teaching competences, for instance by keeping up with new learning methods and media.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Assessment Report
- Video of the facilities
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The peers were able to gain a solid impression of the facilities and laboratories at SUES and particularly at the School of Mechanical and Automotive Engineering with the help of extensive documentation on the laboratories and the equipment. There are several laboratories used for teaching in this programme, amongst them labs for thermal engineering, air conditioning, fluid mechanics, refrigeration, and steam turbines. The peers gain an insight into these laboratories through a video provided beforehand and are satisfied with the presented equipment. The technical equipment for teaching the students on a Bachelor's

level as well as some advanced instruments for conducting research activities are available. Additionally, teaching and learning in this programme is conducted at 8 off-campus facilities of Shanghai-based engineering companies, enabling the students to familiarise themselves with professional practice.

The university's library holds many Chinese as well as international books and periodicals and is open every day from 8 am to 10 pm. Computers in the school's multimedia room are equipped with mechanical simulation and design software such as Solidworks, AutoCAD, LabVIEW and MatLab. The students are generally satisfied with SUES's facilities and equipment. Although the Self-Assessment Report mentions database licenses, during the discussions it remained unclear whether the students actually have institutional access not only to Chinese, but also to international databases that provide valuable resources for their studies. This institutional access has to be guaranteed by SUES.

Regarding the funding of the school and the programme, SUES was unable to provide the necessary information. As such, the peers are unable to give an informed judgement until SUES has provided this information.

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

The peers thank SUES for providing detailed information on the funding of the school as well as the programme. The figures indicate a healthy financial situation with expenditures per student markedly rising over the last years. Therefore, they consider the funding adequate.

SUES has claimed that every student can access international databases through the library. The peers appreciate this, but would like to receive some evidence to support his.

Until then, the peers consider criterion 4 not fulfilled. They recommend to offer more opportunities for already established faculty members to develop their professional and teaching competences.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions

Preliminary assessment and analysis of the peers:
The module descriptions of the programme contain all necessary information about the persons responsible for each module, the teaching methods and workload, the credit points awarded, the intended learning outcomes, the applicability, the admission and examination requirements, and the forms of assessment, and details explaining how the final grade is calculated. As far as the peers can tell, they are published neither on the Chinese nor on the English website. It remains unclear how they are accessible to students and teaching staff.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample Transcript of Records
- Sample Diploma certificate
- Sample Diploma Supplement

Preliminary assessment and analysis of the peers:
The peers confirm that the students of the degree programmes under review are awarded a Diploma and a Diploma Supplement after graduation. The Diploma consists of a Diploma Certificate and a Transcript of Records. The Diploma Supplement contains all necessary information about the degree programme. The Transcript of Records lists all courses that the graduate has completed, the achieved credit points, grades, and cumulative GPA.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Reports

Preliminary assessment and analysis of the peers:
The peers are not able to determine whether the relevant rules containing rights and duties of SUES as well as of its students, for instance the university's statutes, academic guidelines etc., are accessible for anyone involved in the programme. As the students confirm, they receive all relevant course material at the beginning of each semester.

The peers notice that there appears to be no information on the learning outcomes and the courses of the degree programme available on SUES's website. In order to facilitate the choice of programme for prospective students and for all stakeholders, they recommend to provide more information on the programme online.

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

The peers thank SUES for clarifying that students and teaching staff can access the module descriptions through the teaching management system.

They appreciate that the university plans to establish Chinese and English websites to publish information about the degree programmes and recommend to pursue this further.

The peers consider criterion 5 fulfilled.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- Discussions during the audit

Preliminary assessment and analysis of the peers:
The peers learn that there is an institutional system of quality management aiming at continuously improving the degree programmes. Responsibilities have been defined at university, faculty, and department level. SUES collects and analyses data on the achievement of the learning outcomes, student mobility, and the acceptance of alumni on the labour market.

Routine teaching inspections are conducted each semester as well as evaluations on faculty's classroom teaching, lesson plans, exam papers and other basic teaching materials. Furthermore, at the beginning of each semester, the Dean's Office conducts random checks on the exam papers of the previous semester, and evaluates the exam papers based on scores, question analysis and improvement measures so as to promote the standardisation of exam papers.

The student course evaluations are an important part of the quality management system. At the end of each semester, they are asked to provide feedback on the syllabus, assignments, teaching methods and other aspects of the course through a standardised questionnaire. To give more general feedback on the quality of the programme as a whole, focus group discussions with students from different years are organised each semester. As the

peers learn, the results of these evaluations are published university-wide. The students are relatively satisfied with this evaluation assessment, although they remark that the course evaluation questionnaires could include more detailed questions on teaching quality and provide the opportunity to give general suggestions.

Industry representatives, at least from certain local companies that are in close contact to SUES, are involved in the monitoring of the programme via regular meetings in which they can give their opinion on the learning outcomes and curriculum based on their experience with interns or graduates from the programme.

The peers acknowledge that SUES has set up a quality management system containing structures and processes that should be helpful to identify weaknesses and to identify possible solutions. However, from the documentation and the audit discussions they were unable to discern whether this system has in fact helped to identify specific problems within the programme and whether these have been effectively remedied. This is what the peers consider a litmus test for a working quality management system. Therefore, SUES has to ensure that their system continuously improves the programme.

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

The peers thank SUES for providing additional information with regard to the quality management system. However, they still cannot discern whether and in which cases this system has helped to identify and solve existing problems within the programme at hand.

Therefore, the peers consider criterion 6 not fulfilled. SUES has to provide evidence in English that the quality management system is able to fulfil its function within this degree programme.

D Additional Documents

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

D 1. The university shall provide study plans and module descriptions that clearly show which modules belong to which category.
D 2. The university shall provide additional information on the teaching methods employed in the different courses.

D 3. The university shall provide comprehensive information on the funding of the school and the programme.

E Comment of the Higher Education Institution (20.05.2021)

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

- Revised Diploma Supplement
- Exemplary calculation of the achievement of course learning outcomes
- Revised Curriculum
- Documents regarding teaching methods
- Financial information on the school and the programme

F Summary: Peer recommendations (28.05.2021)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Suspension	–	–	–

Prerequisites

V 1. (ASIIN 1.1, 1.3) Redesign the programme to make sure that the students acquire the competences, which they need for their future occupation as professional engineers or to take up consecutive Master's programmes.

V 2. (ASIIN 1.2, 1.3) Ensure that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

Possible Requirements

A 1. (ASIIN 1.1) Make the qualification objectives accessible for all relevant stakeholders and ensure that the stakeholders can refer to them and ensure that they are consistent in all documents.

A 2. (ASIIN 4.3) The students have to be given institutional access to international literature and databases.

A 3. (ASIIN 6) A quality management system has to be implemented that ensures the continuous evaluation and development of the study programme.

Possible Recommendations

E 1. (ASIIN 1.3) It is recommended to strengthen the English language abilities of students, especially regarding technical English.

E 2. (ASIIN 1.3) It is recommended to teach the students more advanced programming and data analysis skills relevant to their field.

E 3. (ASIIN 2.1) It is recommended to strengthen the cooperation with the industry concerning the bachelor's theses.

E 4. (ASIIN 2.1) It is recommended to expand the cooperation with international higher education institutions in the field of the degree programme.

E 5. (ASIIN 4.2) It is recommended to offer more opportunities for already established faculty members to develop their professional and teaching competences.

E 6. (ASIIN 5.3) It is recommended to provide more information on the programme on the Chinese as well as the English website to facilitate choosing a study programme for prospective students.

G Comment of the Technical Committees

Technical Committee 01 – Mechanical Engineering/Process Engineering (04.06.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedures and follows the assessment of the peers without any changes.

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Suspension	–	–	–

Technical Committee 02 – Electrical Engineering/Information Technology (04.06.2021)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure intensively and agrees with the severe shortcomings that the peers have identified within the programme and the institution. Therefore, it follows the peers' assessment without any modifications. The Technical Committee also strongly opts for an on-site visit when it comes to resuming the procedure.

The Technical Committee 02 – Electrical Engineering/Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Suspension	–	–	–

H Decision of the Accreditation Commission (18.06.2021)

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

The Accreditation Commission discusses the procedure and follows the assessment of the peers and the Technical Committees. It considers a suspension of the procedure the only way to give the institution enough time to realise the changes that are necessary according to the judgment of the peers and the Technical Committees.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Suspension	–	–	–

Prerequisites

V 1. (ASIIN 1.1, 1.3) Redesign the programme to make sure that the students acquire the competences, which they need for their future occupation as professional engineers or to take up consecutive Master's programmes.

V 2. (ASIIN 1.2, 1.3) Ensure that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

Possible Requirements

A 1. (ASIIN 1.1) Make the qualification objectives accessible for all relevant stakeholders and ensure that the stakeholders can refer to them and ensure that they are consistent in all documents.

A 2. (ASIIN 4.3) The students have to be given institutional access to international literature and databases.

A 3. (ASIIN 6) A quality management system has to be implemented that ensures the continuous evaluation and development of the study programme.

Possible Recommendations

E 1. (ASIIN 1.3) It is recommended to strengthen the English language abilities of students, especially regarding technical English.

E 2. (ASIIN 1.3) It is recommended to teach the students more advanced programming and data analysis skills relevant to their field.

E 3. (ASIIN 2.1) It is recommended to strengthen the cooperation with the industry concerning the bachelor's theses.

E 4. (ASIIN 2.1) It is recommended to expand the cooperation with international higher education institutions in the field of the degree programme.

E 5. (ASIIN 4.2) It is recommended to offer more opportunities for already established faculty members to develop their professional and teaching competences.

E 6. (ASIIN 5.3) It is recommended to provide more information on the programme on the Chinese as well as the English website to facilitate choosing a study programme for prospective students.

I Resumption of the procedure

1st Comment/opinion of the university (23.05.2023)

Shanghai University of Engineering Science provides extensive documentation on the resumption of the procedure, which is intensively discussed by the auditors. In addition, two of the auditors visited SUES to confirm their overall good impression and to clarify some remaining questions in person in Shanghai.

The changes that were made can be summarized as follows:

I. **Curriculum Redesign and Expansion**

Following feedback from the experts, the programme underwent significant changes to align with industry needs and enhance students' competencies. New courses, such as "Engineering Fundamentals," "Advanced Mathematics," "Fluid Mechanics," and others, were introduced to address knowledge gaps. The restructuring ensures students acquire relevant skills for their careers, with a focus on energy efficiency and renewable energy. English proficiency is emphasised through dedicated courses, and technical subjects like Python and Computer Simulation were added to the curriculum.

II. **Alignment of Programme Name and Objectives**

To address concerns about consistency, the programme's name and objectives were revised. The degree is now labelled "Energy Engineering (Thermal Engineering & Building Environment and Energy Application Engineering)." This change reflects the programme's dual focus and ensures clarity regarding the intended learning outcomes. Detailed information can be found in the revised self-assessment report and the training plan.

III. **Quality Assurance and Stakeholder Accessibility**

To meet the potential requirements, a new website was established to make qualification objectives easily accessible to stakeholders. The site provides comprehensive information on the programme objectives. Students have institutional access to international literature through the university's digital library. The university also implemented a robust quality management system, ensuring continuous evaluation and development of the study programme.

IV. **Recommendations Implementation**

Addressing the recommendations, the curriculum now includes courses to strengthen students' English language abilities and advanced programming and data analysis skills. The programme emphasises industry collaboration for bachelor's theses and has expanded cooperation with international institutions. Faculty members' professional development is actively supported, and information about the programme is made readily available on the English website for prospective students.

These measures collectively enhance the programme's quality, align it with industry demands, and provide students with a comprehensive and competitive education in Energy Engineering.

Assessment of the experts (10.11.2023)

Regarding V1: Redesign the programme to make sure that the students acquire the competences, which they need for their future occupation as professional engineers or to take up consecutive Master’s programmes.

SUES has implemented significant changes to redesign the Energy and Power Engineering Programme, aiming to equip students with competencies crucial for their future roles as professional engineers or for pursuing consecutive master's programmes. The key modifications include:

1. **Foundational Course Addition:**
    - Launch of "Engineering Fundamentals" covering Fourier transforms, linear systems theory, and control systems.
2. **Fluid Dynamics Emphasis:**
    - Introduction of "Advanced Mathematics A (1)/(2)" and "Fluid Mechanics" to provide essential knowledge for designing and optimizing heat transfer systems.
3. **Renewable Energy Integration:**
    - Transition of "New Energy and Energy-Saving Technology" from elective to compulsory, along with new courses on wind power generation and solar energy utilization.
4. **Curriculum Streamlining:**
    - Consolidation of CAD courses into "Professional CAD" and technical English courses into "Technical English."
5. **Technology-specific Additions:**
    - Inclusion of inverter functions in the "Electronic Technology" course.
    - Introduction of active and reactive power knowledge in "Electrical Technology" and "Principles of Steam Turbine" courses.
    - Integration of levelized energy cost concepts into the "New Energy and Energy-Saving Technology" course.
6. **Thermal Systems Optimization Focus:**
    - Launch of the new course "Thermal Power Equipment and System Optimization" to cover mathematical planning and optimization calculation methods.
7. **Computer Science Updates:**
    - Introduction of new computer courses like "Python" and "Computer Simulation Technology and Application."
8. **Programme Direction-specific Compulsory Courses:**
    - Designation of "Pipe Network for Fluid Transmission and Distribution" and "Combustion Science" as compulsory for specific programme directions.

9. **English Language Enhancement:**

    - Introduction of language courses like "Technical English" to improve students' technical language proficiency.

Assessment of the experts:

SUES has strategically integrated fundamental courses in mechanical and electrical engineering, leveraging both its institutional expertise and insights from ASIIN recommendations. Notably, enhancements have been implemented in English language and informatics courses to foster a well-rounded academic experience. The university places a strong emphasis on hands-on, practical courses aimed at honing students' engineering competencies and cultivating independent research capabilities. Given the constraints of the examination system for advanced qualifications in China, the university acknowledges its somewhat limited support. However, as a viable alternative, SUES actively encourages students to explore opportunities for postgraduate studies in international settings.

Regarding V2: Ensure that the name of the degree programme, its intended learning outcomes and its content correspond with each other.

SUES has undertaken strategic changes to align the name of its Energy and Power Engineering Programme with its intended learning outcomes and content. The adjustments were based on recommendations from the experts, current disciplines, faculty capabilities, available facilities, and the evolving needs of the job market.

To ensure clarity and cohesion, the degree programme is now defined as "Energy Engineering (Thermal Engineering & Building Environment and Energy Application Engineering)." This nomenclature corresponds to the two specified directions within the Programme objectives. "Thermal Engineering" aligns with Direction 1, focused on "Energy Engineering and Energy-Saving Technology," supported by a dedicated curriculum. Similarly, "Building Environment and Energy Application Engineering" correlates with Direction 2, centred on "Energy HVAC and Energy Efficiency in Buildings," substantiated by a tailored curriculum structure. These modifications harmonize the name, objectives, and content of the Energy and Power Engineering Programme at SUES.

Assessment of the experts:

SUES has strategically integrated comprehensive courses and study materials within the realms of mechanical and electrical engineering, enriching the academic offerings to provide students with a well-rounded education. Furthermore, recognizing the importance of fluid mechanics in engineering disciplines, the curriculum now includes relevant knowledge

in this area. These additions aim to equip students with a robust foundation, ensuring their readiness to tackle complex challenges in their respective fields and fostering a holistic understanding of key engineering principles.

Regarding A1: Make the qualification objectives accessible for all relevant stakeholders and ensure that the stakeholders can refer to them and ensure that they are consistent in all documents.

SUES has recently launched a comprehensive new website, where all pertinent information has been meticulously compiled and made easily accessible to users.

Assessment of the experts:

While acknowledging that the English website of SUES is still under development, it is noteworthy that despite its incomplete state, the website currently incorporates the qualification objectives of the Energy and Power Engineering Programme. This deliberate inclusion provides prospective students and stakeholders with crucial insights into the programme's objectives and structure, even in its preliminary stages. The ongoing development of the website underscores SUES's commitment to transparency and continuous improvement, signaling a proactive approach to keeping stakeholders informed and engaged.

Regarding A2: The students have to be given institutional access to international literature and databases.

SUES has undertaken significant measures to provide students with institutional access to international literature and databases. The university boasts a digital library equipped with an extensive array of professional papers, electronic books, journals, and reference materials. With an emphasis on modernized management, the library has incorporated services such as document borrowing, copying, printing, and interlibrary borrowing. Additionally, a digital library, namely the Superstar Mobile Library, has been established, enabling faculty members and students to access resources seamlessly through mobile devices.

Moreover, SUES has harnessed the potential of its computer resources, ensuring that over 100 computers in the library, 950 computers in the Computing Center, and 150 computers in the Multimedia Computer Room are readily available for students' academic needs. These resources are strategically placed to support the teaching of essential courses such as "Computer Application Fundamentals," "C Language Programming," and Python.

The information resource platform at SUES is well-structured, encompassing a robust campus network, basic information platforms, and a Campus All-In-One Card system. The campus network, with a bandwidth of 2.3G and full WIFI coverage, supports teaching, scientific

research, and administrative functions. The Curriculum Center, part of the Teaching Management Information System, acts as a repository for over 2,500 courses, facilitating faculty members' teaching and students' independent learning.

Additionally, the university has taken steps to make its facilities accessible to all students, including those with disabilities. The commitment to educational informatization is evident in SUES's IT-based campus infrastructure, characterized by security, efficiency, and openness, meeting the diverse needs of students, faculty members, and researchers.

Assessment of the experts:

During the site visit, the experts were thoroughly convinced and demonstrated that universal access to international literature and databases is readily available. This assurance was further reinforced by the feedback received from students during the subsequent visit. Based on the experts' assessment, it is clear that students are able to access institutional resources for international literature and databases. This confirms the university's unwavering commitment to ensuring the widespread availability of academic resources and support.

Regarding A3: A quality management system has to be implemented that ensures the continuous evaluation and development of the study programme.

SUES has established a comprehensive quality management system to continually evaluate and enhance its Energy and Power Engineering study program. Internal evaluation involves routine inspections, covering aspects like classroom instruction, practice, and graduation projects. Continuous analysis of faculty and student performance informs improvement recommendations. External evaluation includes national-level assessments and municipal-level evaluations, with a feedback system involving students' employers.

Monitoring student numbers, graduation rates, and employment outcomes over the past five years, SUES employs continuous statistics and evaluations for examination results. A robust student evaluation system contributes to teaching method improvements and overall faculty assessment. Transparency is ensured through accessible information on course modules via the university's Information Portal System. Adherence to relevant regulations, including the Teaching Assessment System and Student Admission Assessment, is strictly followed.SUES has implemented a comprehensive quality management system for the continuous evaluation and development of its study program in Energy and Power Engineering. The university employs both internal and external measures to ensure teaching quality and program effectiveness.

Assessment of the experts:

An evaluation system has been implemented, providing systematic feedback to the teaching staff, who are expected to engage in discussions with students about the respective course results. The experts suggest transitioning the evaluation process to a voluntary basis and propose that SUES publishes the evaluation results centrally for greater transparency and accessibility.

Regarding E1: It is recommended to strengthen the English language abilities of students, especially regarding technical English.

SUES has strengthened the English language abilities of students through curriculum adjustments and the introduction of specific courses. Notably, courses such as College English Listening and Speaking (1), College English Listening and Speaking (2), and News English Listening have been implemented to enhance students' English-speaking skills. Additionally, a new course, Technical English, has been introduced to familiarize students with the technical terms relevant to their future careers

Assessment of the experts:

SUES has notably heightened its focus on English oral communication within its English curriculum, a shift supported by information provided by the university. The elevation of emphasis was corroborated through direct feedback from students, signifying a concerted effort by SUES to enhance English communication skills among its student body. This adjustment aligns with the university's commitment to fostering comprehensive language proficiency and promoting effective verbal communication in English. The student confirmation underscores the practical implementation of the initiative, reflecting positively on the university's dedication to language education

Regarding E2: It is recommended to teach the students more advanced programming and data analysis skills relevant to their field.

SUES has adapted its curriculum system to address the dynamic nature of computer languages. To equip students with more advanced programming and data analysis skills, SUES has introduced new courses, including "Python" and "Computer Simulation Technology and Application." These courses aim to enhance students' proficiency in programming languages and provide them with valuable skills in data analysis.

Assessment of the experts:

SUES has recently incorporated valuable additions to its curriculum with the introduction of new computer courses, notably "Python" and "Computer Simulation Technology and

Application," demonstrating a commendable commitment to staying current with technological advancements. While acknowledging these positive strides, it is suggested that further improvements could be explored, particularly in enhancing the difficulty level of the course "Fundamentals of Computer Applications A." This adjustment could contribute to a more robust and challenging learning experience for students in line with evolving educational standards.

Regarding E3: It is recommended to strengthen the cooperation with the industry concerning the bachelor's theses.

SUES has strengthened cooperation with the industry concerning bachelor's theses. Many students' theses are based on technical cooperation projects between faculty advisers and industry partners. Although faculty advisers may complete field projects before students finish their theses, these projects offer valuable practical cases for the students. The program has 13 off-campus practice and practice-based teaching bases, providing platforms and projects for students to complete their bachelor's theses.

Assessment of the experts:

The department has confirmed an escalation in its emphasis on industrial cooperation, with a clear commitment to intensify this focus. The experts' observations in the laboratories revealed multiple ongoing partnerships with industrial entities, underscoring the department's dedication to actively engaging with external stakeholders. This strategic approach not only enhances the practical relevance of its programmes and facilities but also positions the department to offer students valuable real-world experiences and opportunities for applied learning.

Regarding E4: It is recommended to expand the cooperation with international higher education institutions in the field of the degree programme.

SUES has significantly expanded its collaboration with international higher education institutions. Initiatives include the establishment of the International Exchange Office, joint training mechanisms, and faculty exchanges. The School of Mechanical and Automotive Engineering has prioritized internationalized education, fostering partnerships with universities worldwide and participating in joint projects, double degree programs, and international competitions.

SUES collaborates closely with institutions in the United States, Canada, Japan, Australia, and Ireland, promoting faculty exchange and laboratory development. The inauguration of

the "International Cooperation Laboratory" with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) enhances teaching and research. The school's active involvement in international projects and conferences elevates its global engagement.

To accommodate non-Chinese proficient students in the Energy and Power Engineering Program, SUES aims to improve faculty members' spoken English, offer bilingual courses, and intensify Chinese language training for incoming students.

Assessment of the experts:

In its comprehensive self-assessment report, SUES has meticulously outlined a robust network of collaborative partnerships with esteemed international higher education institutions within the domain of the School of Mechanical and Automotive Engineering. This network serves as a testament to SUES's commitment to fostering global academic alliances and promoting cross-cultural exchanges in the field of mechanical and automotive engineering. The report details the nature and scope of these collaborations, emphasizing the diverse opportunities they offer for student and faculty mobility, joint research initiatives, and the exchange of best practices. Such international collaborations not only contribute to the enrichment of academic programmes but also reflect SUES's dedication to providing a globally oriented educational experience for its academic community.

Regarding E5: It is recommended to offer more opportunities for already established faculty members to develop their professional and teaching competences.

SUES prioritizes faculty development, fostering international collaborations through the International Exchange Office. About one-third of faculty members have overseas study backgrounds. Faculty development includes pre-employment training, mentorship programs, and career development plans. SUES encourages faculty to serve temporary positions or study abroad, providing financial support. The Shanghai Municipal Education Commission offers subsidies for research activities and overseas studies, contributing to faculty development and enhancing the university's overall academic and teaching capabilities

Assessment of the experts:

From the experts' observation, the HR department at SUES has presented various programmes for younger staff members. Teaching methods and leadership training fall under another department, and it appears that these areas may not be the primary focus. The experts recommend increasing attention to on-the-job training for all members of the school, aiming for a balanced approach between on-the-job training and leadership development. This adjustment is proposed to ensure a comprehensive and well-rounded professional development framework for the entire academic community.

Regarding E6: It is recommended to provide more information on the programme on the Chinese as well as the English website to facilitate choosing a study programme for prospective students.

SUES prioritizes faculty development through various initiatives. The university established a Teaching Development Center to enhance teaching quality, offering activities like training, forums, and demonstrations. New faculty members undergo pre-employment training, and a mentorship system assigns mentors to guide their development. SUES has a comprehensive career development plan for faculty members, encouraging in-service study for academic degrees. The university supports faculty in serving temporary positions or studying abroad, promoting a "dual-professional" approach.

Financial assistance from the Shanghai Municipal Education Commission includes subsidies for academic visits, industry-university-research development, and research activities. SUES provides start-up funds for new faculty and subsidies for young faculty with doctoral degrees. Talent programs like Zhanchi, Tengfei, and Zhihong offer additional support, totaling subsidies ranging from RMB 120,000 to 400,000

Assessment of the experts:

SUES has published the English information for the Energy and Power Engineering Programme on its website, which aligns completely with the documents submitted for review. Nevertheless, the website design remains incomplete, and the section housing this information is labelled as 'ASIIN,' potentially posing a challenge for certain stakeholders in locating it.

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Without requirements	30.09.2029	–	–

Recommendations

E 1. (ASIIN 4.2) It is recommended to enhance focus on on-the-job training for all members of the school, striving for a balanced approach that integrates on-the-job training and leadership development.

E 2. (ASIIN 4.2) It is recommended to implement more interactive discussions between different departments and industrial experts to foster English communication skills among students.

E 3. (ASIIN 5.3) It is recommended to provide more information on the programme on the Chinese as well as the English website to facilitate choosing a study programme for prospective students.

E 4. (ASIIN 6) It is recommended that evaluations be voluntary and that the results be given directly to the students.

J Assessment of the Technical Committees (27.11.2023)

Technical Committee 01 – Mechanical Engineering/Process Engineering (27.11.2023)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedures and follows the assessment of the peers without any changes.

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Without requirements	30.09.2029	–	–

Technical Committee 02 – Electrical Engineering/Information Technology (24.11.2023)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the decision of the peers without any changes.

The Technical Committee 02 – Electrical Engineering/Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Without requirements	30.09.2029	–	–

K Decision of the Accreditation Commission (08.12.2023)

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

The Accreditation Commission discusses the procedure and follows the decision of the peers without any changes.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Energy and Power Engineering	Without requirements	30.09.2029	–	–

Recommendations

E 1. (ASIIN 4.2) It is recommended to enhance focus on on-the-job training for all members of the school, striving for a balanced approach that integrates on-the-job training and leadership development.

E 2. (ASIIN 4.2) It is recommended to implement more interactive discussions between different departments and industrial experts to foster English communication skills among students.

E 3. (ASIIN 5.3) It is recommended to provide more information on the programme on the Chinese as well as the English website to facilitate choosing a study programme for prospective students.

E 4. (ASIIN 6) It is recommended that evaluations be voluntary and that the results be given directly to the students.

Appendix: Programme Learning Outcomes and Curricula

According to the Diploma Supplement, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Energy and Power Engineering (Thermal Energy En-gineering & Building Environment and Energy Appli-cation Engineering):

"1) Basic scientific literacy and engineering ability

● Understanding and applying mathematics and natural sciences to solve practical engineering problems, which is the foundation of professional competence;

● Ability to understand and participate in general industry processes and meet the requirements of potential positions and technologies;

● Ability to follow the development trend and application prospects of modern science and technology.

2) Professional knowledge and capabilities for Energy and Power Engineering (Thermal Energy Engineering & Building Environment and Energy Application Engineering)

● Ability to acquire and apply professional knowledge in the field of Energy and Power Engineering (Thermal Energy Engineering & Building Environment and Energy Application Engineering);

● Strong skills of professional practice and competence;

● Ability to conduct deep learning, receive advanced studies for higher degrees and conduct scientific research.

3) Ability in international communication Programme Self-Assessment Report Shanghai University of Engineering Science

● Having sufficient English professional knowledge; being able to communicate with foreign counterparts and study abroad;

● Sufficient foreign language and cross-cultural background to be able to work and cooperate in foreign countries or multinational companies.

4) Ability in computer and information applications

● Ability to use computer software and the Internet;

● Common methods for document, information and data retrieval; having the ability to acquire and use information (including documents)

● Having the ability to combine professional knowledge with computers, such as computer-aided design and simulation.

5) Ability in engineering and professional practice

● Ability to design solutions to complex engineering problems in the field of energy engineering and energy-saving technologies (or HVAC and energy-efficient building technologies);

● Ability to design and customize energy engineering solutions, and to demonstrate innovation in the design process whilst considering social, health, safety, legal, cultural, and environmental factors.

● Ability to install, commission, operate, manage and maintain energy equipment in accordance with standards, to perform sound analysis and evaluation of practical engineering problems, and to provide valuable solutions.

6) Teamwork and management competence

● Mental health and personal integrity;

● Having a strong sense of law and social responsibility;

● Having team spirit and management skills;

● Being competent in the competitive environment and challenging tasks.

The Energy and Power Engineering program focuses on the theory, method, practice and application of energy and power vehicle operation, support, maintenance, fault diagnosis and repair as the direction of study and employment. It cultivates engineers with good social adaptability, international vision and engineering practice ability, who have strong theoretical foundation and professional knowledge, and have the ability of operation and maintenance, fault diagnosis, maintenance, management, research and development in energy and power engineering related fields."

The following **curriculum** is presented:

Curriculum of Energy and Power Engineering															
(Note: CP-Credit Points)		Course Lecturer	Type	Chinese CP	ECTS CP	Work load		S1	S2	S3	S4	S5	S6	S7	S8
Competence field	Module					Contact Hours	Self Study Hours	CP	CP	CP	CP	CP	CP	CP	CP
Foreign Language	Comprehensive College English (1)	Gu Jing	L	2	2	32	28	2							
	College English Listening and Speaking (1)	Xu Junhua	L	2	2	32	28	2							
	Comprehensive College English (2)	Chang Ying	L	2	2	32	28		2						
	College English Listening and Speaking (2)	Gu Qingsong	L	2	2	32	28		2						
	Interactive Practical English, 18 Elective Courses for English	Zhang Bei	L	2	2	32	28					2			
Mathematics, Physics and Chemistry	Advanced Mathematics A (1)	Tian Ming	L	5	5	80	70	5							
	Advanced Mathematics A (2)	Cui Wenxia	L	5	5	80	70		5						
	Linear Algebra	Zhao Dejun	L	2	2	32	28		2						
	Probability and Statistics	Wu Suichao	L	3	3	48	42			3					
	College Physics A (1)	Xu Hongixa	L	4	4	64	56		4						
	College Physics A (2)	Chen Guanglong	L	3	3	48	42			3					
	Theoretical Mechanics	Li Peichao	L	3	3	48	42			3					
	College Chemistry	Li Lihong	L	2	2	32	28	2							

(Note: CP-Credit Points)		Course Lecturer	Type	Chinese CP	ECTS CP	Work load		S1	S2	S3	S4	S5	S6	S7	S8
Competence field	Module					Contact Hours	Self Study Hours	CP	CP	CP	CP	CP	CP	CP	CP
Informatics	Information Retrieval	Shen Yuanrui	L&P	1	1	16	14			1					
	Fundamentals of Computer Applications A	Chen Qiang	L&P	2	2	32	28	2							
	VB Programming	Hu Haomin	L&P	3	3	48	42								
	C Language Programming	Chen Qiang	L&P	3	3	48	42		3						
	Python	Liu Xiao	L&P	3	3	48	42								
Engineering Fundamentals	Fundamentals of Engineering Drawing	Zhang Xu	L	3	4	48	72	4							
	Foundation of Manufacturing Technology A	Song Fang	L	3	4	48	72			4					
	Electrical Technology	Su Shengchao	L&P	3	4	48	72			4					
	Electronic Technology	Zhang Wei	L&P	3	4	48	72				4				
	Material Mechanics	Cao Lijie	L&P	3	4	48	72				4				
	Fluid Mechanics	Zhao Yuhan	L&P	3.5	4	56	64			4					
	Engineering Thermodynamics	Cai Yingling	L&P	3.5	4	56	64				4				
	Heat Transfer	Zhao Yuhan	L&P	3	4	48	72				4				
	Fundamentals of Mechanical Design	Zhang Liqiang	L&P	3	4	48	72				4				
	Fundamentals of Control Engineering	Lai Leijie	L&P	2	3	32	58					3			
	Fundamentals of Engineering Materials	Huo Yuanming	L&P	2	3	32	58					3			

(Note: CP-Credit Points)			Course Lecturer	Type	Chinese CP	ECTS CP	Work load		S1	S2	S3	S4	S5	S6	S7	S8
Competence field	Module						Contact Hours	Self Study Hours	CP	CP	CP	CP	CP	CP	CP	CP
	Option	Course Name														
Engineering Applications	Option 1	Combustion Science	Yan Zhenrong	L	3	4	48	72					4			
		Energy Management	Guo Yun	L	2	3	32	58					3			
		Power Engineering Testing Technology	Han Jianjie	L	2	3	32	58					3			
		New Energy and Energy-Saving Technology	Guo Yun	L	2	3	32	58						3		
		Principles of Boiler	Liu Weijun	L	3	4	48	72						4		
		Principles of Steam Turbine	Wang Sha	L	3	4	48	72						4		
		Thermal Power Plant	Guo Yun	L	2	3	32	58							3	
		Automation of Heating and Refrigeration System	Xia Peng	L	2	3	32	58							3	
	Option 2	Built Environment	Fu Yunzhun	L	2	3	32	58					3			
		Heat and Matter Transfer Principle and Equipment	Fu Yunzhun	L	2	3	32	58					3			
		Pipe Network for Fluid Transmission and Distribution	Shen Jun	L	2	3	32	58					3			
		Urban Energy Supply Systems	Chen Yu	L	2	3	32	58						3		
		Heating, Ventilation and Air-Conditioning	Chen Shuai	L	4	6	64	116						6		
		Measurement Technology for Building Environment	Huang Xinghua	L	2	3	32	58							3	
		Cooling and Heat Source Equipment and Systems	Xia Peng	L	3	4	48	72							4	
		Automation of Building Equipment System	Xia Peng	L	2	3	32	58							3	

(Note: CP-Credit Points)			Course Lecturer	Type	Chinese CP	ECTS CP	Work load		S1	S2	S3	S4	S5	S6	S7	S8
Competence field	Module						Contact Hours	Self Study Hours	CP	CP	CP	CP	CP	CP	CP	CP
	Option	Course Name														
Engineering Applications	Option 1	Combustion Science	Yan Zhenrong	L	3	4	48	72					4			
		Energy Management	Guo Yun	L	2	3	32	58					3			
		Power Engineering Testing Technology	Han Jianjie	L	2	3	32	58					3			
		New Energy and Energy-Saving Technology	Guo Yun	L	2	3	32	58						3		
		Principles of Boiler	Liu Weijun	L	3	4	48	72						4		
		Principles of Steam Turbine	Wang Sha	L	3	4	48	72						4		
		Thermal Power Plant	Guo Yun	L	2	3	32	58							3	
		Thermal Automatic Control System	Xia Peng	L	2	3	32	58							3	
	Option 2	Built Environment	Fu Yunzhun	L	2	3	32	58					3			
		Heat and Matter Transfer Principle and Equipment	Fu Yunzhun	L	2	3	32	58					3			
		Pipe Network for Fluid Transmission and Distribution	Shen Jun	L	2	3	32	58					3			
		Urban Energy Supply Systems	Chen Yu	L	2	3	32	58						3		
		Heating, Ventilation and Air-Conditioning	Chen Shuai	L	4	6	64	116						6		
		Measurement Technology for Building Environment	Huang Xinghua	L	2	3	32	58							3	
		Cooling and Heat Source Equipment and Systems	Xia Peng	L	3	4	48	72							4	
		Automation of Building Equipment System	Xia Peng	L	2	3	32	58							3	

0 Appendix: Programme Learning Outcomes and Curricula

(Note: CP-Credit Points)			Course Lecturer	Type	Chinese CP	ECTS CP	Work load		S1	S2	S3	S4	S5	S6	S7	S8
Competence field	Module						Contact Hours	Self Study Hours	CP	CP	CP	CP	CP	CP	CP	CP
Electives	Option	Course Name														
		Professional CAD	Ye Xiao, Wu Tao	L&P	1.5	2	24	36					2	2		
		Computer Simulation Technology and Application	Xiao Lanlan	L	1.5	2	24	36								
		Technical English	Guo Yun	L	1.5	2	24	36								
	Option 1	Principles of Wind Power Generation	Deng Shengxiang	L	1.5	2	24	36					4			
		Air Pollution Control	Wang Sha	L	1.5	2	24	36								
		Technology of Solar Energy Utilization	Yang Fang	L	1.5	2	24	36								
		Energy Storage Principle and Technology	Guo Yun	L	1.5	2	24	36								
		Refrigeration Technology	Xia Peng	L	1.5	2	24	36								
		Thermal Power Equipment and System Optimization	Peng Haiyong	L	1.5	2	24	36								
		Gas Application Engineering	Chen Yu	L	1.5	2	24	36								
		Freeze Drying Technology	Guo Yun	L	1.5	2	24	36								
	Option 2	Technology of Solar Energy Utilization	Yang Fang	L	1.5	2	24	36					4			
		Gas Storage and Distribution	Chen Yu	L	1.5	2	24	36								
		Heating Engineering	Guo Yun, Shen Jun	L	1.5	2	24	36								
		Fundamentals of HVAC Engineering Design	Cai Yingling	L	1.5	2	24	36								
		Heat Pump Technology	Fu Yunzhun	L	1.5	2	24	36								
		Building Energy Conservation Technologies	Huang Xinghua, Ynang Fang	L	1.5	2	24	36								
		Construction Technology for Building Implements	Chen Yu	L	1.5	2	24	36								
		Air Cleaning Technology	Yang Fang	L	1.5	2	24	36								
		Energy Storage Principle and Technology	Guo Yun	L	1.5	2	24	36								
	Innovation and Entrepreneurship Course		Other departments	P	2	2	32	28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Competency Development Course		Other departments	P	2	2	32	28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	Elective Public Course (Discipline-related)		Other departments	P	4	4	64	56	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Elective Public Course (Cross-disciplinary)		Other departments	P	2	2	32	28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25