Accreditation Report

Bachelor's Degree Programmes

Biomedical Engineering
Clinical Engineering

Offered by
Shanghai University of Medicine and Health Sciences

Version: 27/03/2026

Status: *final version*

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	**(Official) English translation of the name**	
生物医学工程	Biomedical Engineering	
临床工程技术	Clinical Engineering	
Date of the contract: 08.09.2024 **Submission of the final version of the SAR:** 05.06.2025 **Date of the onsite visit:** 02./03.07.2025 **at:** College of Medical Instrumentation, Shanghai University of Medicine and Health Sciences		
Expert panel: Univ.-Prof. Dr. Madhukar Chandra – Chemnitz Technical University Prof. Dr. Alexander Heisterkamp – Leibniz University Hannover Prof. Dr. Yang Xuesong – Guangzhou Huali College Dipl.-Ing. Manfred Kindler – Kindler International Division, Dipl.-Ing. FH Biomedizinische Technik Zhu Yi Rong – Nanjing Medical University		
Representative of the ASIIN headquarters: Tamina Renner		
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria as of March 28, 2023 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of September 23, 2022		

B Accreditation Status

Result Overview

The most recent decision for the ASIIN Seal was made by the ASIIN Accreditation Commission on 27.03.2026.

Degree Programmes	ASIIN Seal	Accredited by German Engineers	Validity
Ba Biomedical Engineering	Accredited with requirements	Accredited with requirements	27.03.2026 – 22.04.2027
Ba Clinical Engineering	Accredited with requirements	Accredited with requirements	27.03.2026 – 22.04.2027

Fulfilment of the Accreditation Criteria

ASIIN General Criteria / Subject-Specific Criteria	Ba Biomedical Engineering	Ba Clinical Engineering
1 Degree Programme: Concept, Content & Implementation		
1.1 Objectives and learning outcomes (intended qualification profile)	**Not fulfilled** **Requirement A1**	**Not fulfilled** **Requirement A1**
1.2 Title of the degree programme	Fulfilled	Fulfilled
1.3 Curriculum	**Not fulfilled** **Requirement A2**	**Not fulfilled** **Requirement A2**
1.4 Admission requirements	**Not fulfilled** **Requirement A3**	**Not fulfilled** **Requirement A3**
1.5 Workload and credits	Fulfilled	Fulfilled
1.6 Didactics and teaching methodology	Fulfilled	Fulfilled
2 Exams: System, Concept and Organisation		

ASIIN General Criteria / Subject-Specific Criteria	Ba Biomedical Engineering	Ba Clinical Engineering
2 Exams: System, Concept and Organisation	**Not fulfilled** **Requirement A4, A5, A6**	**Not fulfilled** **Requirement A4, A5, A6**
3 Resources		
3.1 Staff and staff development	Fulfilled	Fulfilled
3.2 Student support and student services	Fulfilled	Fulfilled
3.2 Funds and equipment	Fulfilled	Fulfilled
4 Transparency and Documentation		
4.1 Module descriptions	**Not fulfilled** **Requirement A7**	**Not fulfilled** **Requirement A7**
4.2 Diploma and Diploma Supplement	**Not fulfilled** **Requirement A8**	**Not fulfilled** **Requirement A8**
4.3 Relevant rules	Fulfilled	Fulfilled
5 Quality Management: Quality Assessment and Development		
5 Quality Management: Quality Assessment and Development	Fulfilled	Fulfilled

Requirements

For both degree programmes

A 1. (ASIIN 1.1) Make the training objectives and learning objectives/outcomes accessible for all relevant stakeholders and ensure that the stakeholders can refer to them.

A 2. (ASIIN 1.3) Integrate risk management into quality management.

A 3. (ASIIN 1.4) Colour blindness should not be used as a disqualifying criterion for admission to the study programmes.

A 4. (ASIIN 2) Review examination questions to ensure that they consistently cover the full range of topics defined in the respective module descriptions in order to ensure comprehensive assessment of the intended learning outcomes.

A 5. (ASIIN 2) Ensure that the graduation design (bachelor thesis) consistently includes adequate scientific analysis and critical discussion.

A 6. (ASIIN 2) Include the names of all examiners in the documentation of graduation design (bachelor thesis).

A 7. (ASIIN 4.1) Rewrite the module descriptions so as to include information about person(s) responsible for each module, teaching method(s), credits and workload, intended learning outcomes, date of last amendment, and details explaining how the module mark is calculated for all modules, including the Bachelor thesis.

A 8. (ASIIN 4.2) Revise and adapt the Diploma Supplement according e.g. to the template provided by the European Commission, Council of Europe and UNESCO/CEPES. Characteristics of the study programme, especially the programme learning outcomes; the calculation of the final grade and statistical data need to be part of it.

Accreditation History

The programmes have not been previously accredited by ASIIN.

C Context of the Degree Programmes

C-1 Numbers and facts

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[1]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Biomedical Engineering	Bachelor of Engineering	/	6	Full time residential learning intensive program	/	8 semesters	200 ECTS	annually, 2015
Clinical Engineering	Bachelor of Engineering	/	6	Full time residential learning intensive program	/	8 semesters	199 ECTS	annually, 2017

C-2 Characteristics and features

Shanghai University of Medicine & Health Sciences (SUMHS) is a public higher education institution in the metropolis of Shanghai and describes itself as one of China's leading application-oriented universities in the health sector, integrating disciplines such as medicine, pharmacy, and engineering. The College of Medical Instrumentation (CMI), established in 2015 and building on the legacy of the Shanghai Medical Instrumentation College founded in 1960, reflects this institutional self-understanding. According to the Self-Assessment Report (SAR), it is characterised by the integration of industry and education and the combination of medicine and engineering. The CMI focuses on the biopharmaceutical sector and the cultivation of high-level applied talents. With around 2,000 students enrolled, the college offers four majors, namely Biomedical Engineering (BME), Clinical Engineering (CE), Data Science and Big Data, and Medical Product Administration, preparing graduates for careers in medical device research and development, clinical applications, product administration, and medical big data.

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

The BME programme at SUMHS, launched in 2015, focuses according to the SAR on integrating medical and engineering disciplines. It provides students with a strong foundation in mathematics, natural sciences, and humanities, while emphasising both theoretical knowledge and hands-on engineering practice. The curriculum highlights biomedical electronics, signal processing, and medical instruments, preparing students to solve complex problems in medical technology. With a student-centred approach that links production, learning, research, and application, the programme fosters innovation, teamwork, and practical skills relevant to the medical and industrial sectors.

Established in 2017, the CE programme trains application-oriented professionals who combine technical expertise with clinical understanding and ethical responsibility as stated in the SAR. It equips students with a solid grounding in engineering theory and clinical medicine, enabling them to manage, maintain, and evaluate medical devices and systems in healthcare settings. Emphasising innovation, communication, and interdisciplinary collaboration, the programme develops graduates who can work effectively in hospitals and medical device industries while upholding high moral standards and a commitment to lifelong learning.

The current ASIIN evaluation procedure of these two programmes includes comprehensive documentation review, on-site evaluations, and stakeholder interviews to thoroughly assess the programmes' compliance with international accreditation standards. The detailed evaluation based on ASIIN criteria is provided in the subsequent sections of this report.

D Assessment of the Expert Panel

The following sections of the report are based on the audit discussions the expert panel had with relevant stakeholder groups: Rectorate and college management, programme co-ordinators, teaching staff, students, and industry representatives.

The focus of this stage of the evaluation lies on the assessment of the overall quality level and competence profile of the two Bachelor's degree programmes under review. In addition to the audit meetings, the expert panel relies on the documentation about the programmes and the documentary respectively regulatory framework that Shanghai University of Medicine & Health Sciences provided before, during, and after the audit.

D-1 Objectives and learning outcomes of the degree programmes [ASIIN 1.1]

Description of the current status

Evidence

A. SAR 1.1
B. Appendix 8.1, 8.3 Study Plans
C. Appendix 07 Objective-Module Matrix
D. Appendix 09 Module descriptions
E. Website: https://cmi.sumhs.edu.cn/5d/3e/c11941a286014/page.htm (internal, for the programme objectives)
F. Website: https://www.sumhs.edu.cn/main.htm (university homepage)
G. Website: https://cmi.sumhs.edu.cn/ASIIN_11873/list.htm (ASIIN section of the website)
H. Discussions during the on-site visit

The SUMHS distinguishes in the SAR between *training objectives* and *learning objectives* (also referred to as *learning outcomes*). At the module level, the module descriptions refer to *module objectives* and *intended learning outcomes*.

For the BME programme, five training objectives are defined, designed to align with the development goals of China's national "Healthy China" initiative. They cover aspects such as the integration of social and ethical considerations in engineering problem-solving, the

application of mathematics and natural sciences, engineering innovation and professional practice, as well as communication, teamwork, and lifelong learning skills. The related learning objectives (knowledge, skills, and competences) further elaborate on these areas, encompassing basic scientific literacy, professional and practical engineering capabilities, engineering thinking and problem-solving, international communication, teamwork, and continuous learning. In addition, the BME study plan defines twelve graduation requirements (for example, Engineering Knowledge, Problem Analysis, Design/Develop Solutions, and Lifelong Learning).

The CE programme similarly formulates its training objectives in line with the "Healthy China" strategy, though these are called training standards. They cover areas such as moral and professional integrity, broad interdisciplinary knowledge across natural, medical, and engineering sciences, practical and innovative problem-solving abilities, as well as humanistic, social, and physical well-being. Its learning objectives highlight fundamental and specialised engineering knowledge, international communication, computer and information application skills, professional practice in clinical contexts, and teamwork and management abilities. Instead of the twelve detailed graduation requirements defined in the BME programme, the CE study plan lists twelve industry competencies, which, although described in less detail, cover largely the same content areas.

The following table provides a comparative overview of the different hierarchical levels of objectives and outcomes, as the terminology used in the two programmes is not fully consistent. It also indicates the respective sources within the programme documents.

Biomedical Engineering		Clinical Engineering	
5 training objectives/goals	SAR, study plan	4 training standards	Study plan
12 graduation requirements	Study plan	12 industry competencies	Study plan
6 learning objectives	Website	6 learning objectives	Website
Learning objectives/module objectives	Module description	Module objectives	Module description

The training objectives and learning objectives of both programmes are included in the appendix of this report.

According to the SAR, these objectives are stated to be publicly available on the homepage of the College of Medical Instrumentation; however, this website is accessible only within the university's internal network and is therefore not publicly available to external

stakeholders. They are also not included in the Diploma Supplement (see C-10 Diploma and Diploma Supplement). In the formal documentation, the information on the objectives is only included in the respective study plans of each programme.

Furthermore, the Self-Assessment Report (SAR) presents learning outcomes with corresponding modules that are aligned with the Subject-Specific Criteria (SSC) of Technical Committee (TC) 02 – Electrical Engineering and Information Technology. Although the accreditation procedure was formally coordinated by TC 05, with the involvement of TCs 01 and 02, the university independently chose to align the programmes solely with the SSC of TC 02, as it considered these to be the most relevant to the programme content. This alignment is illustrated in an Objective-Module Matrix, which maps each learning outcome to the respective SSC categories and identifies the modules through which these competences are addressed and assessed.

According to the SAR, the training objectives and learning outcomes for both the Biomedical Engineering and Clinical Engineering programmes are jointly developed by students, teaching staff, and experts from industry and enterprises, and are formally approved by the University Teaching Committee. They are reviewed and updated annually based on feedback and surveys from industrial employers, alumni, students, and faculty members.

Analysis and assessment of the expert panel

The expert panel acknowledges that both the BME and CE programmes at the SUMHS demonstrate a coherent structure of training and learning objectives that are well aligned with the intended qualification level and the Subject-Specific Criteria (SSC) of Technical Committee 02 – Electrical Engineering and Information Technology. The panel also agrees that the SSC of TC 02 are the most appropriate reference for the programme contents and that the criteria of the other committees (TC05 and TC01) are of minor relevance. The panel further confirms that the intended competence profiles correspond to the expected level of qualification under the European Qualifications Framework (EQF).

The panel also notes positively that the objectives and outcomes are reviewed annually based on feedback from students, alumni, employers, and faculty members.

Nonetheless, the expert panel notes inconsistencies in terminology across the two study programmes, as the BME programme refers to *training objectives (or goals)* and *graduation requirements*, whereas the CE programme uses the terms *training standards* and *industry competencies*; moreover, the interchangeable use of *learning objectives* and *(intended) learning outcomes* across both programmes creates additional ambiguity, even though both refer to the same concept within the programme documentation. In the BME module descriptions, the category heading is consistently labelled ‘Module objectives / Intended

learning outcomes', while the corresponding content sections are titled 'Learning Objectives' and 'Module Objectives'. The panel strongly recommends adopting a unified terminology and a clearer hierarchy of objectives and outcomes to ensure transparency and internal coherence.

Furthermore, while the SAR states that the objectives are publicly available, the panel found that they can only be accessed through the university's internal network and are therefore not publicly available to external stakeholders. The panel also notes that the ASIIN section of the website—where the learning objectives are hosted—appears to have been created specifically for the accreditation process and is not visible when navigating the website directly, but only accessible through specific links provided in the SAR. The objectives are also not included in the Diploma Supplement. This situation does not fully meet the ASIIN requirement for transparent publication of programme objectives and learning outcomes.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.1:

After considering the feedback from SUMHS, the panel found that the institution *partially complies* with the criterion.

Accessibility of training objectives and learning objectives/outcomes

The experts acknowledge the university's effort to create a dedicated website for the training objectives and learning objectives/outcomes. While this is a step forward, true "accessibility for all relevant stakeholders" requires intuitive findability. The experts recommend that the university provide a clear navigation path from the main faculty website to this page and reference this URL in key external documents (e.g., admission brochures). The panel therefore opted to maintain a requirement (see below, chapter F-2, A1).

Standardised terminology

Regarding terminology, the experts consider it logical to align the standardisation process with the ongoing revision of the module descriptions. The experts accept the proposed timeline; however, they expect the final, standardised set of terms to be applied consistently across all programme documentation (including the SAR, the website, and the study plans), and not only within the module descriptions. Evidence of this consistency will need to be provided as part of the process for demonstrating fulfilment of the requirements in the event of a subsequent accreditation procedure. The panel proposed to hold on to the initial recommendation concerning this issue (see below, chapter F-2, E1).

D-2 Name of the degree programmes [ASIIN 1.2]

Description of the current status

Evidence

- SAR 1.2
- Appendix 06 Official Programme Name
- Website: https://ieceng.sumhs.edu.cn/1e/53/c11068a269907/page.htm?
- Discussions during the on-site visit

According to the SAR, the degree programme titles “Biomedical Engineering” (in Chinese: 生物医学工程) and “Clinical Engineering” (in Chinese: 临床工程技术) conform to the official nomenclature defined in the *Catalogue of Undergraduate Majors in Ordinary Higher Education Institutions* issued by the Ministry of Education of the People’s Republic of China.

The Biomedical Engineering programme was officially approved by the Ministry of Education in 2015, while the Clinical Engineering programme received ministerial approval in 2016. Both programme titles are consistent with national regulatory standards and ensure formal recognition across Chinese higher education institutions.

Analysis and assessment of the expert panel

The expert panel acknowledges that the programme titles conform to national standards and present no legal or formal inconsistencies. The designation follows the Ministry of Education’s official taxonomy and is therefore recognised within China’s academic and professional systems.

The titles are used consistently in most official documents, including the SAR, official documents, and the university’s website. However, the panel noted that one section of the website refers to the CE programme as “Clinical Engineering Technology” instead of “Clinical Engineering.” This inconsistency should be corrected to ensure uniform usage and to avoid potential confusion.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.2:

After considering the feedback provided by SUMHS, the panel concludes that the university is now *fully compliant* with the criterion.

English name of CE

The name of the degree programme has been corrected on the website, and the English title of the programme is now used consistently across all relevant materials, including the university website.

D-3 Curriculum [ASIIN 1.3]

Description of the current status

Evidence

- SAR 1.3
- Appendix 3 Cooperation Agreements
- Appendix 5. 8 Going Abroad for Postgraduate and International Students
- Appendix 8.1, 8.3 Study plans
- Appendix 8.2, 8.4 Curriculum lists
- Appendix 9 Module descriptions
- Appendix 10 Statistics on Student Mobility
- Appendix 13.1 Clinical Engineering (Undergraduate) Sino-Foreign Cooperative Education Programme Cooperative Education Agreement between Shanghai University of Medicine & Health Sciences and Jikei Group, Osaka, Japan
- Appendix 13.2 Agreement between Monash University and Shanghai University of Medicine & Health Sciences (2024)
- Appendix 15 Statistics on academic success (cohort statistics)
- Appendix 23.1 The Measures for Curriculum Construction and Management
- Discussions during the on-site visit

Content and structure of the programmes

Both the BME and CE undergraduate programmes are designed as four-year (8-semester) degrees, comprising 200 ECTS (BME) and 199 ECTS (CE) respectively. In some documents, such as Appendix 15, reference is made to a total of 11 semesters. Upon request for clarification, the university explained that three intermediate semesters are additionally integrated into the study plans.

The curriculum is structured into nine competence areas, with course content chronologically aligned to build progressively from foundational to specialised knowledge. In semesters 1–4, students complete language and general education courses (e.g., English, philosophy, ideological education, physical education) to support communication skills and humanistic literacy. During the same period, mathematics, natural sciences, information technology, and foundational engineering subjects are introduced to establish the scientific and technical basis for later professional studies.

Professional core engineering modules are primarily taught in semesters 5–6 and reflect the distinct focus of each programme. In BME, these include courses such as Digital Signal Processing, Biomedical Electronics, Artificial Intelligence and Medical Applications, and Intelligent Medical Control Technology. In CE, the core includes Medical Electrical Safety, Biomedical Materials, Medical Treatment Equipment Technology, Principles and Applications of Life Support Equipment, and Biomedical Detection Technology. Elective offerings in semesters 5–7 provide opportunities for interdisciplinary expansion, such as biomedical optics, principles of medical imaging, mathematical modelling, as well as innovation and entrepreneurship.

Practical components and the graduation project (bachelor thesis) are primarily integrated between semesters 4–8. The practical training of the BME programme comprises five core components: laboratory experiments, course design, comprehensive design and graduation design, professional internships, and research and innovation practice. Laboratory experiments build foundational skills in hardware and software implementation in dedicated laboratories and teaching centres. Course design strengthens students' engineering solution capabilities in biomedical electronics and signal processing. Comprehensive design and the graduation project focus on real biomedical applications, based on topics from research and industry. Professional internships provide supervised exposure to medical equipment environments and operational procedures. Research and innovation practice is supported through the college's innovation studio, fostering creativity and applied problem solving.

The practical training of the CE programme comprises four core components: experiments, internship in the medical industry, Clinical Engineering Innovation Design, and the graduation design. Experimental training develops core technical competencies through five courses featuring 40 projects. Internships in clinical departments provide supervised practical experience with medical equipment and clinical operations. Clinical Engineering Innovation Design supports prototype development and entrepreneurial skills. The graduation design aligns with the BME programme regarding implementation and requirements.

Student mobility

Student mobility is currently limited but developing. The BME programme has recently established a 2+2 joint articulation pathway with Monash University in Australia, whereby students who successfully complete the first two years at SUMHS with a minimum average of 70% may complete years three and four abroad.

The CE programme has established a Sino-foreign cooperative undergraduate pathway with Osaka Jikei Group in Japan, enabling students to undertake part of their studies abroad. Students who meet the academic and Japanese language requirements during their first years at SUMHS may complete their senior year at Osaka Jikei and become eligible for dual bachelor's degree conferral upon fulfilling all graduation conditions stipulated by both institutions.

Due to the COVID-19 pandemic, changing political conditions, and the early development stage of the programmes, national and international mobility opportunities such as short-term study periods, internships, and project placements have so far remained limited; however, SUMHS continues to actively expand such cooperation opportunities.

The mobility statistics provided by the university indicate very modest participation levels: in the BME programme, incoming students between 2020 and 2024 ranged from only three to five and outgoing students from two to four, while in the CE programme a single incoming student was recorded for the first time in 2024 and outgoing numbers remained between zero and three, with no students going abroad in 2024.

The field for the mobility programme overview has not been completed, which means that participation numbers for the programmes with Australia and Japan in recent years are not ascertainable. The experts would welcome it if these participation figures could be submitted subsequently as part of the written statement.

Periodic review of the curriculum

According to the SAR, both the BME and CE programmes at SUMHS conduct a periodic curriculum review on an annual basis to ensure alignment with the training objectives, disciplinary developments, and technological advancements. The review is implemented in line with the SUMHS Measures for Curriculum Construction and Management and follows principles of educational value, scientific rigor, and objectivity. It adopts a student-centred approach and evaluates aspects such as clarity of learning objectives, relevance of content, effectiveness of teaching methods, adequacy of learning resources, and responsiveness to industry needs. The process involves evaluation preparation, data collection, expert review, analysis and summary, revision suggestions, and implementation of revisions. Stakeholder feedback, including from students, faculty, and industry experts, is systematically collected through surveys, discussions, and classroom lectures; and used to inform

continuous curriculum enhancement. As a result of these reviews, new courses reflecting emerging technological fields have been incorporated into both programmes.

"The Measures for Curriculum Construction and Management" comprehensively regulates all procedures, responsibilities, and quality requirements for the periodic review and continuous improvement of the curriculum.

Analysis and assessment of the expert panel

Content and structure of the programmes

The expert panel appreciates the overall structure and didactic logic of the curricula. The chronological progression from general education and scientific foundations toward specialised engineering knowledge is coherent and well aligned with the programme objectives. The breadth of subject coverage is appropriate, and the substantial practical components strongly support the development of professional competencies. Students confirmed during the site visit that they are very satisfied with the programmes.

Despite these strengths, the panel identifies areas where further enhancement is advisable. For both study programmes, the integration of risk management within the broader framework of quality management should be strengthened throughout the curriculum in order to reflect contemporary regulatory and operational expectations in the medical technology sector. In doing so, the programmes should ensure that the term risk management is applied in accordance with its internationally recognised understanding as defined in the relevant ISO standards. Furthermore, the panel recommends the design and introduction of transdisciplinary elective modules that explicitly address the rapidly developing interfaces between engineering and medicine.

With regard to the Biomedical Engineering programme in particular, the panel encourages the inclusion of dedicated elective courses on telemedicine and on non-invasive medical imaging technologies such as CT, MRI, NMR and PET, as well as image processing using AI-based tools and signal processing (as EEG, ECG etc.). This would support an appropriate consideration of fast-emerging innovation areas in the discipline. In addition, the content of modules in fields such as robotics, artificial intelligence, and bio-sensing should be subject to systematic and periodic review to ensure continued alignment with the programme objectives and state-of-the-art scientific and industrial practice. The references cited in the module descriptions should be kept up to date accordingly (see also C-10 Module descriptions).

Student mobility

The expert panel notes that opportunities for international mobility are currently limited but acknowledges the university's active efforts to expand cooperation and create additional pathways abroad. Discussions with students indicated interest in studying internationally, partially at the Master's level. According to student feedback, recognition of credits from periods abroad has not posed difficulties for peers in other programmes. The panel notes progress in this area and encourages SUMHS to continue strengthening and diversifying mobility options to facilitate broader international experiences for BME and CE students.

Periodic review of the curriculum

The experts welcome that measures are in place to ensure regular revision and updating of the curriculum. Additional points related to quality assurance are discussed in C-9 Quality management.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.3:

After considering the feedback from SUMHS, the panel found that the university *partially complies* with the criterion.

Risk management

Overall, the panel welcomes the university's efforts to further develop and systematise its risk management approach. The detailed action plan is viewed positively and demonstrates a clear strategic intention. However, it should be noted that internal quality assurance does not replace a comprehensive risk analysis and a systematic risk management framework. While the proposed measures are promising, their verification must be outcome-based and assessed at a later stage. In the event of fulfilling the requirements for an accreditation, the panel considers it essential that concrete evidence be submitted, including in particular:

- Revised syllabi of core courses (e.g., "Medical Electrical Safety," "Therapeutic Equipment Technology") highlighting the added risk management content and learning outcomes.
- Examples of student assignments or exam questions assessing risk analysis (e.g., DFMEA applied to a device design).
- A documented record of a meeting of the proposed "risk management working group."
- Evidence of the announced risk management training for teaching staff.

Therefore, at the present stage, the panel maintains its requirement (see below, chapter F-2, A2).

Transdisciplinary electives

The listed electives demonstrate a positive development and reflect the programme's intention to broaden its academic profile. The panel particularly welcomes the introduction of the courses "Telemedicine" and "Introduction to TCM." However, they suggest that these courses be more clearly mapped to the engineering–medicine interface in future documentation in order to ensure transparency and curricular coherence. As the effective integration and implementation of these measures will require time, the panel maintains its recommendation at this stage (see below, chapter F-2, E2).

Current developments in biomedical engineering (for BME)

The proposed support mechanisms (e.g. dedicated funds and workshops) are appropriate in principle and demonstrate a clear institutional commitment. However, their effectiveness must ultimately be assessed on the basis of measurable outputs. The experts consider it essential that implementation be evidenced through concrete documentation, such as updated syllabi or revised laboratory manuals. While the commitment of the university is duly noted, the actual implementation and impact of these measures will need to be verified at a later stage. Therefore, the experts maintain their recommendation at the present time (see below, chapter F-2, E8).

Updating the module contents (for BME)

The proposed support mechanisms (e.g. dedicated funds and workshops) are appropriate in principle and demonstrate a clear institutional commitment. However, their effectiveness must ultimately be assessed on the basis of measurable outputs. The experts consider it essential that implementation be evidenced through concrete documentation, such as updated syllabi or revised laboratory manuals. While the commitment of the university is duly noted, the actual implementation and impact of these measures will need to be verified at a later stage. Therefore, the experts maintain their recommendation at the present time (see below, chapter F-2, E9).

D-4 Admission requirements [ASIIN 1.4]

Description of the current status

Evidence

- SAR 1.4

- Appendix 1 Student Handbook
- Appendix 11 Admission regulation
- Appendix 12 Admission rate statistics
- Website: https://ieceng.sumhs.edu.cn/AdmissionRequirements/list.htm (admission requirements for international students)
- Website: https://zs.sumhs.edu.cn (admission portal)
- Discussions during the on-site visit

Admission to undergraduate programmes at the SUMHS is based on the National College Entrance Examination (*Gaokao*) or equivalent provincial entrance examinations. Eligible candidates must comply with the laws of the People's Republic of China and have completed senior secondary education or an equivalent qualification. Admission requirements for international applicants are published on the university's English website.

The enrolment process is managed in accordance with national and provincial regulations. SUMHS admits students based on comprehensive evaluation, primarily according to examination results, within the framework of the approved enrolment plan.

According to the SAR, SUMHS ensures transparency and fairness in its admission procedures. Following the national principle of "university responsible, recruitment office supervised," the provincial recruitment offices oversee the implementation of national enrolment policies and supervise universities' compliance. SUMHS has established and implemented the *Regulations on Enrolment and Admission* to standardize procedures and enhance information disclosure. The *National Unified Examination Enrolment Regulations* also outline support measures, including financial assistance schemes for students from low-income families. Regulations on the conversion and credit recognition of academic achievements obtained abroad are defined in the *Student Handbook*. However, as only the table of contents of the handbook was provided to the panel, this information could not be fully verified.

All relevant information is also published on the university's official enrolment website, where prospective applicants can obtain updates and submit enquiries or feedback regarding the admission process.

The university also provides admission statistics for the past five years. As explained by SUMHS, Chinese universities do not operate an application-based admission system but admit students strictly according to their *Gaokao* scores. Each year, a fixed enrolment quota per major is announced, and provincial recruitment offices admit candidates in

descending score order until the quota is filled. This approach reflects the structure of the national higher education admissions system in China and cannot be organised differently at the institutional level. While this results in admission plans being fully met every year, the statistics therefore offer only limited insight into programme-specific demand or competitiveness.

Analysis and assessment of the expert panel

The expert panel recognizes that the programme's admission system is compliant with national Chinese standards and, overall, provides a fair, transparent, and competitive process for student selection. The centralized *Gaokao* system ensures that students admitted to the programme possess a minimum academic level suitable for undergraduate engineering studies.

The admission regulations are binding and transparent, and rules for the recognition of external academic achievements are in place.

Nonetheless, the expert panel notes that the *National Unified Examination Enrolment Regulations (2024)* state under Paragraph 10, *Requirements for Physical Health Condition*, that "the school will not admit students who are colour blind or colour weak." The experts question the basis for this blanket exclusion and ask for the reason behind it, as the underlying rationale is unclear to them. Moreover, the panel considers this exclusion of applicants with colour vision deficiency to be inconsistent with ASIIN standards and strongly recommends that the university review this regulation and consider abolishing it.

The expert panel would also find it helpful if the chapter in the *Student Handbook* concerning credit conversion and recognition could be provided in an English translation for verification purposes (see below D-3).

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.4:

After considering the feedback from SUMHS, the panel found that the university *partially complies* with the criterion.

Colour blindness

While the explanation provided with regard to national policy and professional safety considerations is acknowledged, the experts emphasise that the burden of proof lies with the university to demonstrate that all potential professional fields for graduates in Biomedical Engineering / Clinical Engineering unequivocally and universally require normal colour

vision. This issue remains a major concern, consequently, the experts maintain this major recommendation (see below, chapter F-2, A3).

D-5 Workload and credits [ASIIN 1.5]

Description of the current status

Evidence

- SAR 1.2
- Appendix 8.2, 8.4 Curriculum lists
- Appendix 9 Module descriptions
- Appendix 14 Workload verification
- Appendix 15 Statistics on academic success (cohort statistics)
- Appendix 21 Student surveys and results
- Discussions during the on-site visit

The SAR states that the total student workload of the Bachelor's programmes amount to 200 ECTS in BME and 199 ECTS in CE, corresponding to a four-year structure consisting of eight regular semesters and three additional summer semesters focused on practical training.

The SAR further clarifies the credit system used at SUMHS. Chinese credits account exclusively for contact hours and do not include any self-study components. Based on this system, one Chinese credit corresponds to sixteen contact hours in theoretical modules and thirty-two contact hours in practical modules. To meet the requirement of implementing a workload-based credit point system, the university has already distinguished and separately reported contact hours and self-study time in its module descriptions and applies the ECTS system. Using the standard conversion of approximately 30 hours of total workload per ECTS credit, the university has calculated and assigned ECTS values for all modules accordingly.

Regarding workload distribution, the SAR notes that in BME approximately 55 ECTS credits are allocated to each of the first three academic years. The fourth year is intentionally reduced to roughly 35 ECTS credits in order to provide students with time to participate in advanced competitions, prepare for postgraduate entrance examinations, or focus on job applications. The CE programme follows a similar distribution. According to the SAR, student workload is regularly monitored through surveys to verify that the actual learning

effort aligns with the planned workload. Students confirmed during the on-site visit that the workload is appropriately calculated, allowing for a reasonable balance between academic responsibilities and personal leisure time.

According to the statistics on academic success provided by the university, nearly all students complete their studies within the intended period of study. Only one to two students per cohort require additional time for completion. The dropout rate is also very low, often zero, and at most two students per cohort discontinue their studies.

Analysis and assessment of the expert panel

The expert panel considers the organisation and calculation of workload to be appropriate and coherent with the requirements of a workload-based credit point system. The systematic distribution of credits across the academic years is well justified, avoids excessive peaks in workload, and enables students to maintain a balanced schedule. Students confirmed their satisfaction with the workload and the balance it allows between academic tasks and personal life. The conversion of Chinese credits into ECTS credits is transparent and consistent with established standards.

However, the panel notes that the documentation provided for workload verification is not yet complete. The university submitted only sample examinations, exercises, and related teaching materials as evidence. The student surveys that were submitted do not include items specifically addressing the actual workload experienced by students. For systematic workload verification, the panel would expect corresponding survey data to be provided and therefore requests that the university provide this evidence by means of a supplementary submission (see D-3).

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.5:

After considering the feedback provided by SUMHS, the panel considers the university to *substantially comply* with the standard.

Workload surveys

Based on the survey results provided in the attachment, the experts consider the overall design of the students' academic workload to be appropriate. The survey instrument itself is rather basic; however, it demonstrates a clear intention on the part of the university to monitor student workload systematically. For further development, the experts recommend refining the survey design by incorporating more differentiated and nuanced questions in order to obtain more detailed and analytically meaningful feedback. Therefore, the experts add a corresponding recommendation (see below, chapter F-2, E3).

D-6 Didactics and teaching methodology [ASIIN 1.6]

Description of the current status

Evidence

- SAR 1.6, 1.7
- Appendix 9 Module descriptions
- Appendix 21 Student surveys and results
- Discussions during the on-site visit

According to the SAR, the predominant didactic method used in the BME and CE programmes is classroom-based lecturing. Additional methods such as group work, project-based learning, case studies, and flipped classroom formats are also applied where appropriate. In the module descriptions, the section “Teaching Methods” specifies whether the respective module is delivered as lessons, lab work, lectures, internships, projects, practicing teaching or a combination of these formats, with lessons and lab work being the predominant forms, followed by lectures.

The university states that there are no institutional guidelines prescribing specific didactic approaches; teaching staff are free and qualified to select suitable methods, and the university provides relevant pedagogical training (see C-8 Staff and staff development).

Teaching is mainly conducted on-site. Basic and general education courses are delivered in larger groups of approximately 60 students, while specialised courses are taught in smaller classes of around 30 students. Several courses include in-class experimental components, usually organised in batches or groups.

Online tools are used primarily to support on-site teaching. Most courses provide dedicated course sites on the SUMHS online platform, offering additional learning resources and promoting self-directed study outside the classroom.

To foster innovation and entrepreneurial competencies, a dedicated practice module is in place. Under academic supervision, students can earn credits through competitions, company projects, or research activities including publications and patents.

Graduate teaching satisfaction, based on a third-party survey (MyCOS), has shown a steady upward trend from 2020 to 2023. Furthermore, student surveys also include an evaluation of whether teaching effectively supports the acquisition of theoretical knowledge and professional skills.

Analysis and assessment of the expert panel

The expert panel concludes that a suitable variety of teaching and learning methods is employed in the BME and CE programmes at SUMHS to support the achievement of the intended learning outcomes and promote student-centred learning. Classroom-based lecturing is effectively complemented by active learning formats such as group work, project-based learning, lab work, and supportive online tools. The combination of on-site teaching with digital learning resources is considered appropriate and mutually reinforcing.

Students are introduced step by step to practical work through laboratory training, research involvement, project components, and the final thesis. The mix of contact hours and self-study elements appear well balanced and aligned with the requirements of the programmes.

Student feedback confirms that the applied teaching methods are well received: survey results indicate a high level of satisfaction with teaching overall, and students interviewed highlighted lecturers' strong teaching skills, accessibility, and openness to questions and feedback. These mechanisms contribute to the continuous reflection on teaching effectiveness.

A minor inconsistency was noted in the module descriptions of the BME programme, where the "Type of teaching" is missing in two courses ("11 Python Programming Design" and "21 Artificial Intelligence and Medical Applications"). The panel recommends ensuring full documentation for all modules (see C-10 Module descriptions).

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.6:

The panel considered SUMHS *fully compliant* with the standard.

D-7 Exams: System, concept, and organisation [ASIIN 2]

Description of the current status

Evidence

- SAR 2
- Appendix 9 Module descriptions
- Appendix 16 Examination Regulations
- Appendix 22.2 The Regulations on the Administration of Student Status of Full time Undergraduate Students

- Appendix 24 Graduation Design (Thesis) Management
- Samples of course assessments, exams and final thesis
- Discussions during the on-site visit

According to the information provided in the SAR, the rules governing examinations at SUMHS are stipulated in the "Regulations on Examination Management" (2022). Examinations in the BME and CE programmes are designed to assess whether students achieve the intended learning outcomes defined in the respective module descriptions. The examination formats and the calculation of grades are likewise specified at module level in the module descriptions.

A variety of assessment types is employed across the programmes, including written examinations, comprehensive exercises, course design or experimental tasks, as well as course reports and assignments. Results are normally graded using a 100-point scale; the grading information presented in the SAR (5-grade or 10-level system) appears inconsistent with the standard practice. However, the document *The Regulations on the Administration of Student Status of Full-time Undergraduate Students* includes a conversion of percentage grades into a letter-grade system as well as the calculation method for the GPA.

Students are informed about assessment requirements primarily through course syllabi, which correspond to the module descriptions.

Most theoretical modules are assessed through formal written exams, whereas practical components — such as laboratory courses, project work, and internships — are evaluated on the basis of attendance, performance, and final reports. Students are given access to their examination results via the university's information system and may request a review of examination papers if required.

The organisation of examinations follows institutional procedures intended to ensure adequate preparation time and to prevent workload peaks. Regular examinations are generally held during a central examination period, while assessments in elective modules may be scheduled earlier in the semester. The timeframes for examination periods are fixed and communicated to students in advance; however, the specific examination dates within these periods are announced no later than two weeks before to the assessment.

Transparent arrangements exist for make-up examinations, repeated course attendance, and justified absences. Students with disabilities or special needs may receive appropriate compensation measures. Rules addressing academic misconduct, including fraud and plagiarism, are set out in the same "Regulations on Examination Management".

The programmes conclude with a 16-week graduation design (bachelor thesis) undertaken in the final semester. The requirements, assigned tasks, and timeline are formalised, and students are supervised throughout the process with regular progress reporting. According to the SAR, thesis topics originate mostly from research projects conducted by academic staff, real-world problems in medical institutions, or industrial engineering applications. The final grade is based on the written thesis and an oral defence, and is awarded by the supervising lecturer, a reviewing lecturer, and a defence committee. However, in the submitted thesis samples, the roles and grading responsibilities were not always clearly documented.

Quality assurance for examinations includes regular reviews by the Academic Affairs Office, which analyse, inter alia, learning-outcome alignment, difficulty, question types, and grade distribution. Feedback is communicated to teaching staff and programme leadership to support continuous improvement.

Analysis and assessment of the expert panel

The expert panel concludes that the examination system in both programmes is generally well structured and effectively implemented. Students reported a high degree of satisfaction with the organisation of examinations, including the feedback they received on their performance. As most students had not yet failed a module examination, the panel was not able to conclusively evaluate the effectiveness of re-sit procedures; however, students appeared confident that appropriate options exist.

Overall, the examinations are mostly aligned with the intended learning outcomes and combine various assessment formats suitable for theoretical and practical components. The panel also positively recognises the systematic procedures in place for ensuring fairness, supporting students with special needs, and safeguarding academic integrity.

Nevertheless, the panel has identified areas for improvement. First of all, examination papers should consistently cover the full scope of content described in the module descriptions. During the on-site review, the expert panel observed that, for instance, the examination in *Advanced Mathematics* did not fully address all relevant subject areas. Ensuring comprehensive coverage is important to validate learning outcomes appropriately.

With respect to the graduation design (bachelor thesis), the panel welcomes the structured process and the strong integration of applied research topics. However, in several thesis samples, the scientific analysis and critical discussion were underdeveloped. The panel therefore strongly recommends that supervising faculty place stronger emphasis on these aspects and ensure their systematic inclusion in the thesis report.

Furthermore, while the SAR specifies that assessment of the thesis involves a supervising lecturer, a reviewing lecturer, and a defence committee, this was not clearly reflected in the submitted thesis documents, where often only the supervisor's name was indicated. The panel assumes this to be a documentation issue but considers it essential that the second examiner is explicitly named to ensure transparency.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 1.5:

Review examination questions

The experts note that the term "peer institutions" remains vague and would require further clarification. It should be clearly specified whether this refers to other universities, external industry experts, or an internal cross-departmental committee. The corresponding procedure must be transparently defined. As concrete results of this process have yet to be demonstrated and further clarification is needed, the requirement remains in place (see below, chapter F-2, A4).

Adequate scientific analysis and critical discussion in the graduation design

The experts emphasise that consistency in thesis assessment is of central importance. A possible way to address this could be the development and implementation of a standardised "Thesis Assessment Rubric" with explicit criteria and defined weightings, particularly for aspects such as "scientific analysis" and "critical discussion," to be applied uniformly by all examiners. In addition, training workshops for supervisors on the transparent and consistent application of such criteria could further support this objective. As tangible results and evidence of consistent implementation have yet to be demonstrated, the requirement remains in place (see below, chapter F-2, A5).

Names of the examiners

The experts welcome the university's intention to address this issue, as they consider it fundamental for ensuring transparency. However, as no concrete evidence of implementation has yet been provided, the experts maintain the requirement at this stage (see below, chapter F-2, A6).

D-8 Resources [ASIIN 3]

Description of the current status

Evidence

- SAR 3

- Appendices 5.5–5.7, 5.9–5.10 Evidence of staff publications, research projects and awards
- Appendix 18 Staff Handbook
- Appendix 19 HR Plan
- Appendix 25 Lab Management
- Discussions during the on-site visit

Staff and staff development [ASIIN 3.1]

According to the university, the College of Medical Instrumentation provides sufficient and well-qualified academic staff for the Biomedical Engineering and Clinical Engineering programmes. With 31 full-time lecturers allocated to the two programmes and an overall student-to-staff ratio of approximately 15:1, the staffing level ensures, according to the SAR, that all students receive adequate academic guidance and supervision. The lecturers hold diverse and relevant academic backgrounds spanning biomedical engineering, electronic and information engineering, measurement and control engineering, optical engineering, biomechanics, and related areas. In the BME programme, around 40% of the full-time lecturers have more than one year of overseas study or work experience, and in the CE programme the proportion is nearly 38%.

Teaching staff are engaged in both education and research. In recent years, they have participated in national and provincial teaching reform and curriculum development projects, contributed to the establishment of first-class undergraduate courses, published educational research papers, and authored textbooks. They have also carried out externally funded research projects, published SCI/EI-indexed papers, and obtained authorized patents. These activities are intended to support the alignment of teaching with current developments in the field.

The university offers comprehensive professional development opportunities through the *Lecturer Development Center*, including onboarding training, mentoring for young lecturers, career development programmes, and domestic and international study visits. Staff also receive financial support from Shanghai Municipal Education authorities and SUMHS to enhance their teaching and research competencies.

Teaching quality is systematically monitored through regular inspections and evaluations. Where improvement needs are identified, targeted training measures are provided. In addition, activities such as supervising student research and innovation projects are

incorporated into performance assessments and promotion criteria, ensuring ongoing commitment to teaching excellence.

Student support and student services [ASIIN 3.2]

SUMHS provides a comprehensive support system to ensure students' academic success, wellbeing, and professional development:

- Student Affairs Office: Oversees ideological and political education, student management, scholarships and financial aid, employment guidance, dormitory management, and mental health services.
- Student Counselor System: Each programme has full-time counselors responsible for students' daily life guidance, psychological counseling, communication with families, and organisation of cultural and sports activities. They support career planning throughout all study phases, including job preparation for graduating students.
- Academic Advisor System: All new students are assigned an academic advisor who provides personalised academic and career guidance and supports students' participation in scientific research and innovation projects.
- Enterprise Mentor System: Industry mentors from relevant enterprises and institutions guide students during internships, focusing on professional ethics and practical skills. Students choose mentors aligned with their interests, ensuring stronger industry–university collaboration.

Funds and equipment [ASIIN 3.3]

In terms of financial resources, the university states in the SAR that the funds for the BME and CE programmes come from government allocations and are reliably secured. According to the SAR, there are currently no bottlenecks in equipment or facilities; in case of shortages, the responsible units may apply for additional budgets or share equipment with other departments. In addition, there are targeted investments in teaching, laboratory development, and student innovation activities.

The infrastructure available for teaching, research, and practical training is according to the university adequate in both quantity and quality. This includes modern teaching buildings, smart classrooms, specialised laboratories, a well-equipped Experimental Training Centre, extensive library and IT resources, as well as fully wireless network coverage across campus. The facilities enable students to conduct theoretical, experimental, and practice-oriented learning in an up-to-date environment.

Internal and external cooperation is governed by binding regulations. Laboratory management follows a clearly defined multi-level governance structure, and all safety and operational procedures are formally regulated in the *Experimental Rules for Students of The College of Medical Instrumentation*. Collaborations with affiliated hospitals, external enterprises, and international partners are based on institutional agreements that ensure a stable and effective framework for practical training, research cooperation, and international exchange.

During the site visit, the expert panel visited study-related facilities, in particular the laboratories used for the two degree programmes. The laboratories are generally classified into three categories: Discipline Basic Laboratories, Comprehensive Application Laboratories, and Innovation Research Laboratories.

Analysis and assessment of the expert panel

Staff and staff development [ASIIN 3.1]

The panel notes that the SUMHS demonstrates a clear strategic direction and effective leadership, supported by a well-defined development plan for the academic staff and the study programmes.

The teaching staff present a high level of motivation and strong commitment to both teaching and research activities. Their engagement in externally funded projects, patent development, and educational innovation contributes to a dynamic academic environment. Furthermore, the programmes benefit from well-established collaborations with industry partners and hospitals, which support practical training, applied research, and the continuous alignment of teaching with professional needs.

Overall, the panel is convinced that the staffing situation, professional background, and support structures for personnel development are appropriate to ensure the successful delivery and further enhancement of the study programmes.

As a minor recommendation for improvement, the panel suggests strengthening continuous professional development in two areas: First, introducing structured English-language training for faculty members, making use of internal resources already available within the institution; and second, expanding opportunities for temporary placements (secondments) in local or external industrial or medical establishments. These measures would further support the international orientation and practice-based profile of the programmes and appeared to be in line with the wishes expressed by the teaching staff during the visit.

Student support and student services [ASIIN 3.2]

The experts note that SUMHS provides comprehensive and well-organised support services that are easily accessible to students. According to student feedback, advice, counselling, and support are readily available and effectively address students' needs. The experts also recognise that there are sufficient opportunities for extracurricular engagement, including student unions and clubs, which contribute positively to students' overall university experience. Overall, the experts consider student support at SUMHS to be effective and appropriate.

Funds and equipment [ASIIN 3.3]

The expert panel confirms that the existing infrastructure and financial support are adequate to deliver the programmes. The panel also notes that there are well-developed interdisciplinary teaching and laboratory resources which effectively support both theoretical and practical components of the curriculum.

During discussions with students, the panel learned that students are generally very satisfied with the available laboratories and equipment, as well as with the sufficient number of workspaces provided on campus.

However, the expert panel observed that the laboratory facilities presented during the site visit are mainly focused on sensor demonstration, robot programming, and troubleshooting of equipment or instruments. In line with the programme objectives, the panel recommends that the scope of laboratory work, as reflected in the laboratory handouts and student reports, be broadened to better illustrate the underlying theory, methods, and applications of the medical instruments under study.

To gain a more comprehensive understanding, the expert panel kindly requests the submission of additional documentation, including photographic evidence of laboratory facilities—particularly those that could not be visited during the on-site evaluation—to provide a clearer impression of their equipment, layout, and suitability for teaching purposes. The panel also requests examples of laboratory documentation, such as representative handouts, instructions, and materials provided to students for conducting laboratory work, especially the instructions regarding risk management measures.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 3:

After considering the feedback provided by SUMHS, the panel considers the university to *substantially comply* with the standard.

English-language training for faculty members

The experts welcome the university's intention to expand English language training opportunities for faculty members. The ideas outlined in the statement represent a constructive approach to strengthening the programme's international profile. At the same time, the experts note that effective implementation will require time and sustained commitment. In order to ensure transparency and accountability, it is further suggested that a measurable goal be defined to monitor progress and evaluate the impact of the measures. As concrete evidence of implementation and measurable outcomes has not yet been provided, the recommendation remains in place (see below, chapter F-2, E4).

Opportunities for secondments

The experts state that the policy document provided by SUMHS is excellent and establishes a strong and well-structured framework. For verification purposes, the experts would appreciate the submission of an anonymised log or summary report for the year 2025 documenting these secondments. This would allow for an assessment of both the scale and the substantive content of the activities carried out. A related recommendation was hold up to direct subsequent reviewers' attention (see below, chapter F-2, E5).

Scope of laboratory work

The experts welcome the university's plan to provide a more comprehensive exposition of fundamental principles within the programme. However, in addition to revised module descriptions, the implementation needs to be shown in updated laboratory handouts that clearly demonstrate the enhanced theoretical and methodological depth. Such handouts should move beyond purely procedural instructions and include, for example, sections on the underlying theory, the relationship between expected results and real-world variability, and the clinical significance of the measurements. Until corresponding evidence of implementation is provided, the recommendation remains in place (see below, chapter F-2, E6).

D-9 Quality management: Quality assurance and development [ASIIN 5]

Description of the current status

Evidence

- SAR 5
- Appendix 2 Quality management handbooks

- Appendix 21 Student surveys and results
- Discussions during the on-site visit

The quality management system of SUMHS as explained in the SAR is based on several institutional regulations aimed at ensuring continuous improvement in teaching and learning. These documents cover different aspects of quality assurance, including teaching quality monitoring, standard setting, and procedures for addressing teaching-related issues. On this basis, the College of Medical Instrumentation has established reportedly a closed-loop teaching quality management system, combining two core elements: (1) the cultivation programme formation and revision and (2) the teaching quality monitoring and assessment. The process follows a cyclical approach involving planning, implementation, evaluation, and feedback.

The formulation and revision of cultivation programmes are regulated by the *Measures for the Management of Undergraduate Study Plan of SUMHS (2021)*. The programmes are reviewed annually based on national standards, industrial needs, student career development, and accreditation requirements.

Quality assessment at SUMHS takes place on both internal and external levels. Internal assessment involves lecturers, students, and administrative departments through online evaluations, teaching inspections, and feedback meetings held each semester. Teaching quality is monitored across classroom instruction, practical training, and assessment procedures, while exam papers are reviewed by the Academic Affairs Office. Student evaluations and peer reviews are key components, feeding into teaching improvement and lecturer performance development.

External assessment involves the Ministry of Education, employers, and external experts who participate in teaching evaluations. In addition, third-party assessments such as the *MyCOS Data Co., Ltd.* provide feedback on teaching satisfaction, practical training, and innovation-related education.

All related information is reportedly published in the teaching quality evaluation reports of SUMHS; however, this documentation was not made available for review.

Analysis and Assessment

The experts note that SUMHS has established a comprehensive internal quality assurance (QA) system that operates at both university and programme levels. The framework is well-defined and structured through a series of institutional regulations and handbooks covering different aspects of teaching quality, curriculum development, and performance monitoring.

The experts confirm that internal quality assurance activities are carried out regularly and include the participation of all relevant stakeholders, including students. The results of these assessments are incorporated into the continuous improvement of the programmes. The SAR provided several concrete examples of how such feedback has led to programme adjustments, which the experts view positively.

Although SUMHS reportedly compiles an annual evaluation report, this document was not made available for review. The experts were, nevertheless, provided with the results from the Student, Graduate, and Employer Questionnaires from recent years, which offered a good insight into the university's quality assurance practices.

While the QA framework is well-documented and the procedures are clearly regulated, the experts note that the results of evaluations and resulting follow-up actions are not systematically communicated to students or other stakeholders. During the site visit, students reported that test scores become accessible only after completing course evaluations, but that evaluation results themselves therefore could not be discussed in class. The experts therefore strongly recommend that course coordinators ensure that feedback is actively provided to students following their course evaluations.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 5:

After considering the feedback from SUMHS, the panel found that the institution *partially complies* with the criterion.

Discussion of survey results

The experts welcome the measures undertaken by the university in response to this issue. However, they note that the current approach does not yet fully address the underlying concern. In its present form, the procedure appears rather ad hoc and lacks a consistent, institutionalised structure. The experts therefore consider it advisable to establish a formal and transparent process. A possible approach could be to require lecturers, at the end of each semester, to dedicate 15–20 minutes of a session to present a summary of the semester's student feedback and to outline which measures, if any, will be implemented as a consequence. Such a procedure would visibly close the quality assurance loop and demonstrate respect for student input. As a systematic and binding framework has not yet been demonstrated, the requirement remains in place (see below, chapter F-2, A9).

D-10 Transparency and documentation [ASIIN 4]

Description of the current status

Evidence

- SAR 4
- Appendix 9 Module descriptions
- Appendix 20 Graduation certificates
- Appendix 22.1 Regulations on Student Management in Ordinary Higher Education Institutions
- Discussions during the on-site visit

Module descriptions [ASIIN 4.1]

According to the SAR, detailed information on each module—including the responsible teaching staff, teaching methods, workload, credits, expected learning outcomes, applicability, admission and examination requirements, evaluation forms and grade calculation—is available through the university's information and teaching management portal. Both students and lecturers can access this system with their university ID to view current and past learning or teaching tasks.

The module descriptions for BME and CE, updated in 2024, are provided in Appendices 9.1 and 9.2 of the SAR.

Diploma and Diploma Supplement [ASIIN 4.2]

The SAR confirms that graduates of both the BME and CE programmes at SUMHS receive a Diploma in Chinese with a Transcript and a Diploma Supplement in English shortly after graduation. Samples of graduation certificates are provided in Appendix 20. The Diploma Supplement contains general information on the student's qualification profile, individual academic performance, and the classification of the degree programme within the national education system.

However, the section describing the student's qualification profile is very brief and does not provide information on the programme learning outcomes. Moreover, the method for calculating the final mark is not explained and the Diploma Supplement does not include statistical grade distribution data as recommended in the ECTS Users' Guide.

Relevant rules [ASIIN 4.3]

According to the SAR, the rights and duties of the institution and its students are clearly defined and binding. To ensure effective teaching and safeguard the interests of all stakeholders, SUMHS has developed a comprehensive regulatory framework.

Analysis and assessment of the expert panel

Module descriptions [ASIIN 4.1]

Comprehensive module descriptions are available for both programmes, which is positive and in line with formal requirements. The documentation provides detailed information on workload, credits, teaching methods, learning outcomes, and examination modes, and it is accessible to students and lecturers via the university's online portal.

Nevertheless, the module handbooks still require some editorial revision and standardisation. The date of last amendment is missing for the module descriptions as a whole and should be stated once on the cover page of each document. In many modules, the grading scheme states that "the course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam." However, it remains unclear what exactly the regular grade comprises—whether it refers to participation, presentations, assignments, or other forms of continuous assessment.

In both Bachelor Thesis modules, essential information is missing, e.g. the number of ECTS credits, the person(s) responsible for the module (not necessarily the supervisor but someone who can provide academic guidance), and clearly defined intended learning outcomes.

In addition, both handbooks contain a number of typographical and formatting inconsistencies. Examples from the BME module description include: missing teaching methods in Module 11 (Python Programming Design) and Module 21 (Artificial Intelligence and Medical Applications); workload and type of teaching being swapped in Module 61 (Principles of Medical Imaging); workload expressed in credit hours instead of hours in Modules 4 and 5 (Medical Chemistry – Inorganic/Organic); and inconsistent workload figures in Module 9 (Probability Theory and Mathematical Statistics).

It is further recommended to include more English-language literature, especially in the fundamental courses, and to ensure that all references are kept up to date. The experts noted that the current reading lists consist almost exclusively of Chinese sources, some of which appear rather dated. Given the fast-evolving nature of the disciplines involved it would be beneficial to complement the existing literature with more recent and internationally recognised English publications.

In conclusion, the experts see a need for revision with regard to the formal aspects of the module descriptions. All modules must fully comply with the ASIIN criteria and include every required element in a consistent format. Moreover, the reviewers recommend the inclusion of more up-to-date and English-language literature to ensure that the study programmes reflect the current state of international research and practice.

Diploma and Diploma Supplement [ASIIN 4.2]

The expert panel welcomes that a Diploma Supplement in English is issued for both the BME and CE programmes and that it includes key academic information. Nevertheless, the current format does not fully comply with the standards recommended by the European Commission, Council of Europe, and UNESCO/CEPES. The main shortcomings concern the absence of programme learning outcomes, the lack of an explanation of the final grade calculation, and the missing statistical grade distribution data, which would allow readers to better contextualise individual marks.

Relevant rules [ASIIN 4.3]

The experts confirm that, in particular, the *Regulations on Student Management in Ordinary Higher Education Institutions* issued by the Ministry of Education clearly define the rights and obligations of students and the university, including procedures for appeals and complaints. During the site visit, students confirmed that all relevant information is readily accessible through information materials and the university's website. In addition, the student counsellor provides guidance and ensures that students are well informed about their rights and responsibilities.

Final assessment of the experts after the statement of the Higher Education Institution regarding criterion 5:

After considering the statement of SUMHS, the panel concluded that the university *partially complies* with the standard *(holistic judgment for criterion 4; 4.3 fully compliant; 4.1 and 4.2: partly compliant).*

Module descriptions [ASIIN 4.1]

As no revised module descriptions have been submitted to date, the experts conclude that the recommendation has not yet been sufficiently addressed. Consequently, the requirement remains in place (see below, chapter F-2, A7).

List of references [ASIIN 4.1]

The experts emphasise that a generic commitment is not sufficient to adequately address the issue. They would welcome the integration of a mandatory "literature review and update" step into the university's annual curriculum revision process in order to ensure systematic and evidence-based updating of course content. As this structured approach has not yet been demonstrated, the recommendation is maintained (see below, chapter F-2, E7).

Diploma Supplement [ASIIN 4.2]

The experts acknowledge that the Diploma Supplement has been revised. However, in its current version it still lacks several essential elements, in particular a clearly designated section entitled “Programme Learning Outcomes” summarising the key competences, a transparent explanation of the final grade calculation method (i.e. how the overall GPA is derived from the individual module grades), and statistical data on the grade distribution of the respective cohort. In addition, the formal and official adoption of the revised document is still pending. As these aspects have not yet been fully addressed, the requirement is maintained (see below, chapter F-2, A8).

E Request for additional information

1. Overview of student participation in the exchange programmes with Australia and Japan over the past years
2. English Translation of the chapter “Management Measures for the Conversion and Credit Recognition of Academic Achievements Obtained Abroad” from the *Student Handbook.*
3. Student workload monitoring surveys and results.
4. Photographic documentation of laboratory facilities specifically those labs that could not be visited during the on-site evaluation.
5. Examples of laboratory documentation including representative handouts, instructions, and materials provided to students for conducting laboratory work.

F Comment of the Higher Education Institution (05.12.2025)

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

- Attachment A1 – Example of the Diploma Supplement
- Attachment A2 – Regulation on the Recognition and Cultivation of Dual-Qualified Lecturer (Translated Document A2-1, Original Document A2-2)
- Overview of student participation in Australia and Japan exchange programs in recent years. (A3-1, A3-2, A3-3)
- English translation of the chapter "Regulations on the Transfer and Credit Recognition of Academic Achievements Obtained Abroad" from the Student Handbook. (A4)
- Survey on student workload monitoring and its results. (A5)
- Photographic documentation of laboratory facilities, particularly those not visited during the on-site assessment. (A6-1, A6-2)
- Examples of laboratory documentation, including representative handouts, instructions, and materials provided to students for conducting laboratory work. (A7-1, A7-2, A7-3, A7-4)

The following quotes the statement of the university:

“<u>Major recommendations</u>

<u>For both degree programmes</u>

R1. (ASIIN 1.1) It is strongly recommended to make the training objectives and learning objectives/outcomes accessible for all relevant stakeholders and ensure that the stakeholders can refer to them.

All related documents for both programs including the program objectives, course learning objectives, and intended learning outcomes have been and will continue to be permanently accessible to all relevant stakeholders via a dedicated section on the college of instrumentation (CMI) website at https://cmi.sumhs.edu.cn/56/34/c11873a284212/page.htm.

R2. (ASIIN 1.3) It is strongly recommended to integrate risk management into quality management.

The integration of risk management into the overall quality management system will be initiated and continuously optimized, with consideration given to both curriculum design for the students and program execution for the university/college board. The following aspects/measures will be placed into action:

A. Structural design of the integration: Revise professional quality management documents to embed risk management requirements throughout the entire cultivation chain, including key aspects such as curriculum design, practical lecturing, and assessment evaluation. Clearly define the operational procedures for “risk identification – assessment – control – monitoring”.

B. Integration into curriculum and practice: Introduce risk management modules into core courses, incorporating industry-standard methods such as DFMEA (Design Failure Mode and Effects Analysis) and PFMEA (Process Failure Mode and Effects Analysis). Establish risk logs and emergency response procedures during practical sessions, including clinical internships and equipment operations.

C. Mechanism and support development: Establish a risk management working group composed of program leaders, industry experts, and lecturing supervisors to conduct regular risk screening and evaluation of talent cultivation quality. Allocate dedicated funding to support faculty participation in risk management training and lecture reform initiatives.

D. Dynamic optimization and feedback loop: Utilize data from the lecturing monitoring platform, combined with industry feedback and graduate tracking information, to dynamically update risk registers and control measures. Form a continuous improvement mechanism to ensure the system remains aligned with industry developments and accreditation requirements.

R3. (ASIIN 1.4) It is strongly recommended that color blindness should not be used as a disqualifying criterion for admission to the study programmes.

The disqualifying criterion for the color blindness for the BME and CE programs is stated in the university student admission requirement which is guided and implemented in accordance with the national enrollment guidelines issued by the Chinese Ministry of Education. The introduction of this policy is based on the core consideration of the professional requirements following graduation in these two programs, which is specifically reflected in two aspects:

A. Safety and Precision in Practical Operations: Biomedical engineering involves the development, debugging, and maintenance of medical devices (such as imaging equipment and patient monitors). These devices often rely on color differentiation

for indicator lights, display data, and fault codes. Color blindness may lead to misjudgment of device status or operational errors, potentially causing medical safety risks.

B. Industry Standards and Professional Entry Requirements: The medical equipment industry (including medical device manufacturing and clinical engineering technical services) adheres to strict professional norms. Certain positions explicitly require normal color discrimination ability. Program admissions must align with these professional entry thresholds in advance to prevent graduates from facing restrictions due to color blindness.

However, with ongoing technological advancements, such as the development of assistive devices for color vision deficiency, this policy is certain to be relaxed in the near future. Our university will actively propose adjustments during the annual Ministry of Education conference on employment demand statistics for academic programs, striving to contribute to efforts aimed at improving the current situation.

R4. (ASIIN 2) It is strongly recommended to review examination questions to ensure that they consistently cover the full range of topics defined in the respective module descriptions to ensure comprehensive assessment of the intended learning outcomes.

We will implement stricter control over the design of examination questions to ensure that the assessment scope of the test papers comprehensively covers all key points outlined in the course syllabus. Whether questions are developed by examination committees or selected from question banks, in addition to self-assessment, all draft test papers will be submitted to peer institutions for third-party analysis and evaluation. The final version of the examination paper will be determined after synthesizing the feedback from these evaluations.

R5. (ASIIN 2) It is strongly recommended to ensure that the graduation design (bachelor thesis) consistently includes adequate scientific analysis and critical discussion.

The following steps/measures have been and will be further implemented to ensure the bachelor thesis meets a consistent standard with adequate scientific analysis and critical discussion.

A. Higher quality standards will be defined and distributed to the faculty members and graduating students to ensure a shared awareness. The thesis must present a coherent research process—from problem identification and methodology development to results and conclusions—supported by authentic data or reasonable assumptions and employing professional methods such as experimentation, simulation, or data analysis. The thesis should not only present results but also compare

them with existing research, articulate the strengths and limitations of the work, identify sources of error, and suggest directions for improvement or further research. Thesis topics with clear scientific outputs that address identified research gaps are encouraged. Purely descriptive literature review or purely applied operational thesis works (e.g., studies that only require equipment configuration without subsequent data-driven argumentation) are discouraged.

B. Throughout the entire cycle of student thesis work, faculty will provide methodological support through specialized workshops (such as “Academic Critical Methodology” and “Data Visualization and Analytical Logic”) and distribute annotated examples of high-quality theses. These examples will highlight best practices in scientific analysis and critical discourse. A model thesis repository will subsequently be established to serve as a benchmark reference for future cohorts of students.

C. Student thesis proposals will undergo a dual-review process: evaluation by academic advisors (focusing on scientific methodology and analytical rigor) and industry experts (providing practical perspectives and contextual validation). Regular group seminars are mandatory, during which key milestone assessments and scientific reviews will be conducted. The blind review process will be further strengthened. Relevant provisions have now been established (e.g., “lack of substantive scientific analysis in the thesis” constitutes grounds for postponing the defense).

D. Clearly define and strictly enforce the grading criteria for degree theses, appropriately increasing the weighting of the scientific argumentation section in evaluations. During thesis defenses, place greater emphasis on assessing students' analytical logic and scientific argumentation skills, while simultaneously strengthening scrutiny of the thesis's substantive scientific content.

E. By regularly organizing training sessions and inviting experts from both within and outside the university to share best practices in “facilitating critical discussions among students,” the professional capabilities of academic advisors will be further enhanced. Concurrently, feedback from employers regarding graduates' “scientific analytical skills” and “critical thinking abilities” will be collected and distributed to advisors. This information will serve as a guideline for determining thesis topic requirements and the necessary scientific background.

R6. (ASIIN 2) It is strongly recommended that the documentation of graduation design (bachelor thesis) clearly indicates the names of all examiners.

All submitted bachelor's theses will be graded by the assigned supervisor and an additional examiner, with the final assessment conducted collectively by all examiners present during

the defense session. During the grading process, the name of the additional examiner will not be disclosed to the student or their supervisor. However, this information is fully recorded within the electronic grading system. Therefore, following the recommendation of the expert panel, this information will be attached to the thesis in paper form after all grading is completed to ensure comprehensive archival documentation.

R7. (ASIIN 4.1) It is strongly recommended to rewrite the module descriptions so as to include information about person(s) responsible for each module, lecturing method(s), credits and workload, intended learning outcomes, date of last amendment, and details explaining how the module mark is calculated for all modules, including the Bachelor thesis.

We appreciate the recommendations from the expert panel and have initiated the module description revision process. Given that this work involves courses offered across multiple departments within our university, extensive communication and coordination are required. We respectfully request an extension to ensure the revisions are comprehensive and meet ASIIN's standards. Should the extension be granted, we commit to submitting the final version of the module descriptions via email by no later than December 31, 2025.

R8. (ASIIN 4.2) It is strongly recommended to revise and adapt the Diploma Supplement according e.g. to the template provided by the European Commission, Council of Europe and Unesco/CEPES. Characteristics of the study programme, especially the programme learning outcomes; the calculation of the final grade and statistical data need to be part of it.

We will fully adapt the recommendation from the ASIIN expert panel. We have already drafted the diploma supplement, see attachment A1. Upon approval by the university's academic affairs office, such supplement will be issued to the graduates together with the diploma.

R9. (ASIIN 5) It is strongly recommended to ensure that students are informed about the survey results.

In addition to the university-level "student forum" held each semester, where survey findings, student suggestions, and corresponding follow-up measures are shared with the student body, our college (CMI) will also implement the following measures to ensure timely and effective communication of such information.

A. Student feedback and suggestions regarding courses and lecturers have been and will continue to be accessible through the lecturing evaluation system.

B. Student suggestions concerning general college matters have been and will be communicated to the student body via the class group chats (e.g. Wechat) by the corresponding tutors or via the announcement board located in front of the college administration office (building 18, floor 5, south campus).

C. Suggestions from individual students regarding personal issues, along with the corresponding measures taken, have been and will be communicated in person for the sake of privacy. To ensure transparency and proper documentation, signed confirmation from both parties will be required.

For the Bachelor programme in clinical engineering

R10. (ASIIN 1.2) It is strongly recommended that the English title of the degree programme be used consistently across all relevant materials, including the university website.

Inconsistences have been corrected in all relevant materials including the university website. The term “Clinical Engineering” is used.

Minor recommendations

For both degree programmes

R 11. (ASIIN 1.1) It is recommended that the terminology used for the objectives and learning outcomes be standardised and applied consistently across all relevant documents.

In accordance with Recommendation R7, a standardized set of terminology will be consistently applied across all relevant documents, especially in the module descriptions to be submitted by the end of December 2025.

R12. (ASIIN 1.3) It is recommended to design and introduce transdisciplinary electives that address emerging interfaces between engineering and medicine.

In recognition of the emerging interfaces between engineering and medicine – a priority also highlighted by the ASIIN expert panel - we have already established interdisciplinary electives such as “Medicine and Humanities”, “Biomedical Optics”, “Introduction to Brain Science”, “Biomedical Materials”, and “Medical Device Regulatory Science”. These courses are explicitly designed to meet the mainstream requirements for interdisciplinary knowledge. In the near future, more elective courses such as “Telemedicine”, “Introduction to Medical Imaging Equipment”, and “Introduction to Traditional Chinese Medicine”, etc. will be established to broaden the students’ view in specialized areas.

R13. (ASIIN 3.1) It is recommended to introduce structured English-language training for faculty members

The English proficiency of our faculty will be enhanced through the following measures to adapt to the trend of internationalization and meet the ASIIN accreditation standards:

A. Providing more overseas exchange and training opportunities to motivate lectures for self-directed learning.

B. Organizing one-on-one tutoring sessions conducted by English department faculty, tailored to specific course content.

C. Incentivizing the attainment of globally recognized English certificates (e.g., TOEFL, IELTS) by incorporating them into the annual performance bonus evaluation.

R14. (ASIIN 3.1) It is recommended to expand opportunities for secondments in local or external industrial or medical establishments for faculty members.

Mechanisms and channels for university-enterprise and university-university collaborations – including secondments, short-term exchanges, and job rotations – have been fully established at three levels: the Shanghai Municipal Education Commission, higher education institutions, and our institute. Concurrently, all faculty and staff members may participate in domestic and international academic exchange programs to undertake short-term assignments at enterprises or medical institutions. For instance, attachment A2 provides a translated version of the policy document issued by the university's Human Resources Department, detailing regulations encouraging faculty participation in practice-oriented exchange activities. This initiative aligns seamlessly with the college's development plan. Based on the data for 2025, the average annual duration of industry-academia collaboration per faculty member at the CMI is for 2025 is 85 days.

R15. (ASIIN 3.3) It is recommended that the scope of laboratory work be broadened to better illustrate the underlying theory, methods, and applications of the medical instruments under study.

For the BME program, the core courses consist of “Application Technique of Single Chip Microcomputer”, “Artificial Intelligence and Medical Applications”, “Digital Signal Processing”, “Biomedical Electronics”, and “Principle and Applications of Medical Instruments”, and “Intelligent Medical Control Technology”. They both incorporate dedicated laboratory sessions that contribute to the student’s final grade. These laboratory sessions/courses are conducted in Building 18 (room 205 and 306) and building 6 (room 502 and 504) at the south campus.

For the CE program, the core courses consist of “Principle and Applications of Life Support Equipment”, “Therapeutic Equipment Technology”, “Biomedical Detection Technology”, “Biomedical Materials”, and “Medical Electrical Safety Engineering”. They both embed own laboratory sessions which also contribute to the final grade of the student. These laboratory sessions/courses are held in the Building 18, room 213, 311, and 313.

Photographs of all relevant laboratory rooms and equipment have been provided in the additional documents, as also requested there.

In addition to the laboratory work, subsequent revisions to the following courses—"Principles and Applications of Medical Instruments”, “Biomedical Electronics”, “Principles of Medical Imaging”, “Biomedical Ultrasound Technology”, and “Virtual Medical Instrument Design”—will incorporate enhanced chapters and instructional content that provide a more comprehensive exposition of the fundamental principles, methods, and applications of medical devices.

R16. (ASIIN 4.1) It is recommended to ensure that the references listed in the module descriptions are consistently kept up to date and include a broader selection of English-language and international literature.

We appreciate the recommendations from the ASIIN expert panel. We commit to regularly updating reference materials, such as during the annual syllabus revision process. This initiative will also be implemented through the annual lecturing methods and curriculum development workshop. Furthermore, we will significantly increase the proportion of original English-language reference materials and books.

For the Bachelor programme in Biomedical Engineering

R17. (ASIIN 1.3) It is recommended to further align the curriculum with current developments in biomedical engineering by introducing elective courses in telemedicine and modern non-invasive imaging methods, including CT, MRI, NMR, PET, and AI-based image and signal processing (as EEG, ECG etc.).

The Biomedical Engineering program currently offers courses such as “Principles of Medical Imaging” (Program Elective), “Principles and Applications of Medical Instruments” (Program Core), and “Artificial Intelligence and Medical Applications”. These courses cover modern non-invasive imaging methods (including CT, MRI, NMR, PET) and AI-based image and signal processing (e.g., for EEG, ECG). We fully concur with and will integrate the experts' suggestions to ensure the continuous updating of our course content. In the next academic year's curriculum revision, courses such as “Telemedicine” will be incorporated to establish a comprehensive corresponding knowledge system in this field for the students.

R18. (ASIIN 1.3) It is recommended to regularly review and update the module contents in rapidly advancing fields such as robotics, AI, and biosensing in alignment with the programme objectives.

In addition to the content mentioned in the aforementioned R17 response, subjects such as robotics, artificial intelligence, and biosensing will be progressively integrated into core curriculum modules. The priority list for curriculum updates includes courses “Artificial Intelligence and Medical Applications”, “Intelligent Medical Control Technology” (including a specialized unit on machine learning in medical image analysis), “Biomedical Detection Technology”, “Principles and Applications of Biosensors”, and “Intelligent Medical Robotics”. More importantly, the university and college will provide necessary resources to support the implementation of these new modules and courses, while conducting faculty training to enhance their lecturing capabilities in relevant fields. A dedicated fund will be established to support faculty participation in academic conferences, industry internships, and specialized training in areas like artificial intelligence and biosensing. At least two cutting-edge technology workshops will be held annually. A digital lecturing resource repository will be developed concurrently, integrating the latest industry case studies and virtual simulation experiments. Lecturing materials will be regularly updated to ensure the timeliness and practical relevance of the curriculum.”

The curriculum of Biomedical Engineering is presented on the following pages (based on Appendix 8.2 of the SAR):

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
1	Advanced Mathematics（1）	80	70	150	5
	College Physics	64	86	150	5
	College English (1)	64	26	90	3
	C Program Design	48	72	120	4
	Introduction to Biomedical Engineering	32	43	45	2.5
	Outline of Modern Chinese History	48	12	60	2
	Situation and Policy	32	13	45	1.5
	Physical Education（1）	30	0	30	1
	College Chinese	32	13	45	1.5
	Public electives-1	16	14	30	1
		Total-1		**795**	**26.5**
2	College Physics Experiment	16	14	30	1
	Advanced Mathematics（2）	80	70	150	
	Medical Chemistry (Organic)	16	14	30	1
	Medical Chemistry (Inorganic)	16	14	30	1
	College English (2)	64	26	90	3
	Python Program Design	32	43	75	2.5
	Introduction to Engineering	32	28	60	2
	Circuit Theory	48	27	75	2.5
	Morality and Law	48	12	60	2
	Military Theory & Training	64	11	75	2.5
	Mental health education for university students	32	13	45	1.5
	Fundamentals and Applications of MATLAB	64	11	75	2.5
	Physical Education（2）	30	0	30	1
	Public electives-2	16	14	30	1
		Total-2		**855**	**28.5**
3	Linear Algebra	32	58	90	3
	Probability Theory and Mathematical Statistics	48	57	105	3.5
	Preclinical Medicine Theories	128	52	180	6
	College English (3)	64	26	90	3
	Engineering Mechanics	48	72	120	4
	Analog Electronic Technology	64	56	120	4
	Basic Principles of Marxism	48	12	60	2
	Career Planning and Employment	16	14	30	1

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
	Guidance				
	Physical Education（3）	30	0	30	1
	Public electives-3	16	14	30	1
		Total-3		**855**	**28.5**
4	Medical Statistics	32	58	90	3
	College English (4)	64	26	90	3
	Digital Electronic Technology	48	72	120	4
	Mechanical Drawing	64	71	135	4.5
	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	48	12	60	2
	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	32	13	45	1.5
	Comprehensive Experiment of Analog Electronic Technology	32	43	75	2.5
	Comprehensive Experiment of Digital Electronic Technology	32	43	75	2.5
	Comprehensive Design of Electronics	64	56	120	4
	Physical Education（4）	30	0	30	1
	Public electives-4	16	14	30	1
		Total-4		**870**	**29**
5	Principal of Clinical Medicine	32	73	105	3.5
	Signals and Systems	48	102	150	5
	Biomedical Engineering Research Norms and Ethics	16	44	60	2
	Biomedical Sensors	32	58	90	3
	Application Technique of Single Chip Microcomputer	48	72	120	4
	Artificial Intelligence and Medical Applications	32	88	120	4
	Biomedical Optics*	32	28	60	2
	Principles of Medical Imaging*	32	28	60	2
	Medicine and Humanities*	32	28	60	2
	Medical Device Regulatory Science*	32	28	60	2
	Biomedical Materials*	32	28	60	2
	Biomedical Detection Technology*	32	28	60	2
	Public electives-5	16	14	30	1
		Total-5		**1035****	**34.5****
6	Digital Signal Processing	32	58	90	3
	Biomedical Electronics	32	58	90	3

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
	Principle and Application of Medical Instruments	32	58	90	3
	Intelligent Medical Control Technology	48	57	105	3.5
	Biomechanics*	32	28	60	2
	Biomedical Ultrasound Technology*	32	28	60	2
	Virtual Medical Instrument Design*	32	28	60	2
	Mathematical Modeling*	32	28	60	2
	Human body Function Replacement Device*	32	28	60	2
	Introduction to Brain Science*	32	28	60	2
	Microcomputer Principle and Application*	64	26	90	3
	Digital Signal Processing Course Design	32	13	45	1.5
	Biomedical Electronics Course Design	32	13	45	1.5
	Professional Internship	64	26	90	3
	Public electives-6	16	14	30	1
		Total-6		**1035****	**34.5****
7	Principle and Application of Embedded System*	32	28	60	2
	Medical Image Processing and Analysis*	32	28	60	2
	Medical Laboratory Instruments and Technology*	32	28	60	2
	Integrated Biomedical Engineering Design	64	56	120	4
	Physical Education（5）	30	0	30	1
	Social practice	128	22	150	5
	Labor education	32	13	45	1.5
	Innovation and entrepreneurship	64	56	120	4
		Total-7		**645****	**21.5****
8	Bachelor Thesis	0	480	480	16
		Total-8		**480**	**16**
		OFFERED		**6570**	**219**
		REQUIREMENT		**(6000**)**	**(200**)**

Directions:

* Professional electives. Each student should achieve 14 ECTS in total before graduation.

** The actual study hour for each student is 6000 (ECTS = 200).

The training objectives and intended learning outcomes for the Bachelor's degree programme Clinical Engineering based on the SAR are listed below.

"It aims to cultivate high-level applied talents with strong ideological and political integrity, a solid foundation in the humanities and sciences, and a firm grounding in the core values of socialism. The program emphasizes all-round development in moral, intellectual, physical, aesthetic, and labor education. Graduates are expected to possess a solid foundation in engineering technology and theory, fundamentals of clinical medicine, as well as the ability to identify and solve practical problems in clinical engineering. These professionals are expected to be capable of working in clinical engineering positions in hospitals or other healthcare institutions, engaging in clinical application, functional development, technical management, maintenance, and training of medical equipment. Additionally, they can work in medical device companies or organizations, focusing on technical research and development and technical support, ensuring the safety and effectiveness of medical instruments during clinical use."

Learning Objectives (Knowledge, Skills and Competences) based on the (internal) website:

1) Fundamental Scientific Literacy and Engineering Skills

6. Demonstrate the ability to understand and apply mathematical and scientific principles to address practical engineering challenges, forming a basis for professional competence.
7. Acquire foundational knowledge in basic and clinical medicine to meet technical and role-specific requirements.
8. Stay informed on developments in modern science and technology and their application prospects.

2) Specialized Knowledge and Skills in Clinical Engineering

- Possess knowledge and practical skills in engineering drawing, electronics, and electrical engineering, with basic competencies in network information technology, computer applications, and maintenance.
- Develop strong professional and technical skills relevant to clinical engineering.
- Lay the groundwork for advanced study, research, and professional development.

3) International Communication Proficiency

- Gain sufficient expertise in English to engage with international peers and pursue further studies abroad.

- Demonstrate the ability to search, read, and translate specialized materials in foreign languages, along with collaboration skills in technical documentation.
- Be equipped with cross-cultural and linguistic competencies to work effectively in international environments or multinational companies.

4) Computer and Information Application Abilities

- Acquire proficiency in computer software and network utilization.
- Master common methods for literature, information, and data retrieval, with the ability to gather and utilize information effectively.
- Integrate specialized knowledge with computer skills, such as computer-aided design (CAD) and simulation.

5) Engineering and Professional Practice Skills

- Develop solutions for practical problems encountered in clinical engineering roles, particularly in intensive care, dialysis centers, operating rooms, and other hospital settings.
- Be proficient in the installation, calibration, operation, and maintenance of critical medical devices, such as ventilators, dialysis machines, heart-lung machines, defibrillators, and infusion pumps.

6) Teamwork and Management Abilities

- Demonstrate good mental health and personal integrity.
- Possess legal awareness and a sense of social responsibility.
- Exhibit a spirit of teamwork and basic management skills.
- Capable of performing effectively in competitive and challenging work environments

The curriculum of Clinical Engineering is presented on the following pages (based on Appendix 8.4 of the SAR):

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
1	Advanced Mathematics	160	35	195	6.5
	College English (1)	64	26	90	3
	Mechanical Drawing	64	71	135	4.5
	Engineering Mechanics	32	58	90	3
	Medical Ethics*	32	28	60	2
	Outline of Modern Chinese History	48	12	60	2
	Situation and Policy	32	13	45	1.5
	Physical Education	144	6	150	5
	Public electives-1	16	14	30	1
		Total-1		**855**	**28.5**
2	College Physics	32	43	75	2.5
	College Physics Experiment	16	14	30	1
	College English (2)	64	26	90	3
	C Program Design	48	72	120	4
	Circuit Theory	48	27	75	2.5
	Clinical Engineering Introduction	32	58	90	3
	Ethics and Rule of Law	48	12	60	2
	Military Theory	36	9	45	1.5
	Military Skill	64	11	75	2.5
	Mental Health Education for University Students	32	13	45	1.5
	Comprehensive Practice of Mechanical Drawing	32	43	75	2.5
	Public electives-2	16	14	30	1
		Total-2		**790**	**27**
3	Probability Theory and Mathematical Statistics	32	58	90	3
	Normal Anatomy and Physiology	64	71	135	4.5
	College English (3)	64	26	90	3
	Foundation of Mechanical Designing	48	72	120	4
	Analog Electronic Technology	64	56	120	4
	Introduction to Big Data*	32	28	60	2
	Basic Principles of Marxism	48	12	60	2
	Career Planning and Employment Guidance	16	14	30	1
	Public electives-3	16	14	30	1
		Total-3		**735**	**24.5**

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
4	Linear Algebra	48	72	120	4
	Foundation of Disease	32	58	90	3
	College English (4)	64	26	90	3
	Literature Retrieval Course	32	43	75	2.5
	Digital Electronic Technology	48	72	120	4
	Medical Electrical Safety Engineering	48	87	135	4.5
	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	48	12	60	2
	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	32	13	45	1.5
	Comprehensive Experiment of Analog Electronic Technology	32	43	75	2.5
	Comprehensive Experiment of Digital Electronic Technology	32	43	75	2.5
	Medical Electrical Safety Training	32	43	75	2.5
	Clinical Engineering Creativity	32	43	75	2.5
	Public electives-4	16	14	30	1
		Total-4		**1065**	**35.5**
5	Principles and Applications of Medical Statistics	48	72	120	4
	Microcontroller Principles and Applications	48	72	120	4
	Biomedical Materials	32	58	90	3
	Biomedical Detection Technology	48	87	135	4.5
	Hydraulic and Pneumatic Technology	32	58	90	3
	Introduction to Medical Device Regulation Science	32	58	90	3
	Medical Imaging Equipment	32	58	90	3
	Advanced Clinical Engineering	32	58	90	3
	Medicine and Humanity	32	13	45	1.5
	Public electives-5	16	14	30	1
		Total-5		**900**	**30**
6	Therapeutic Equipment Technology	48	87	135	4.5
	Principle and Applications of Life Support Equipment	48	87	135	4.5
	Biomedical Optics*	32	28	60	2
	Principles of Medical Imaging*	32	28	60	2

Semester	Course	Contact Hour	Self-study Hour	Total Hour	ECTS
	Mathematical Modeling*	32	28	60	2
	Clinical Skills	48	72	120	4
	Medical Internship	64	26	90	3
	Public electives-6	16	14	30	1
		Total-6		**690**	**23**
7	Fundamentals and Applications of MATLAB*	32	28	60	2
	Technical English for Clinical Engineering*	32	28	60	2
	Intelligent Medical Robot*	32	28	60	2
	Internet and Information Security*	32	28	60	2
	Social practice	128	22	150	5
	Labor education	32	13	45	1.5
	Innovation and entrepreneurship	64	56	120	4
		Total-7		**555**	**18.5**
8	Bachelor Thesis	0	480	480	16
		Total-8		**480**	**16**
		TOTAL		**6090 (5970**)**	**203 (199**)**

Directions:

* Professional electives. Each student should achieve 14 ECTS in total before graduation.

** The actual study hour for each student is 6000 (ECTS = 200).

GSummary: Expert recommendations (06.02.2026)

Taking into account the additional information and the statement given by Shanghai University of Medicine and Health Sciences, the experts summarise their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Accredited by German Engineers	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Biomedical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–
Ba Clinical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–

Requirements

For both degree programmes

A 9. (ASIIN 1.1) Make the training objectives and learning objectives/outcomes accessible for all relevant stakeholders and ensure that the stakeholders can refer to them.

A 10. (ASIIN 1.3) Integrate risk management into quality management.

A 11. (ASIIN 1.4) Colour blindness should not be used as a disqualifying criterion for admission to the study programmes.

A 12. (ASIIN 2) Review examination questions to ensure that they consistently cover the full range of topics defined in the respective module descriptions in order to ensure comprehensive assessment of the intended learning outcomes.

A 13. (ASIIN 2) Ensure that the graduation design (bachelor thesis) consistently includes adequate scientific analysis and critical discussion.

A 14. (ASIIN 2) Include the names of all examiners in the documentation of graduation design (bachelor thesis).

A 15. (ASIIN 4.1) Rewrite the module descriptions so as to include information about person(s) responsible for each module, teaching method(s), credits and workload,

intended learning outcomes, date of last amendment, and details explaining how the module mark is calculated for all modules, including the Bachelor thesis.

A 16. (ASIIN 4.2) Revise and adapt the Diploma Supplement according e.g. to the template provided by the European Commission, Council of Europe and UNESCO/CEPES. Characteristics of the study programme, especially the programme learning outcomes; the calculation of the final grade and statistical data need to be part of it.

A 17. (ASIIN 5) Ensure that students are informed about the survey results.

Recommendations

E1. (ASIIN 1.1) It is recommended that the terminology used for the objectives and learning outcomes be standardised and applied consistently across all relevant documents.

E2. (ASIIN 1.3) It is recommended to design and introduce transdisciplinary electives that address emerging interfaces between engineering and medicine.

E3. (ASIIN 1.5) It is recommended that the university refine its student workload survey by introducing more nuanced questions.

E4. (ASIIN 3.1) It is recommended to introduce structured English-language training for faculty members.

E5. (ASIIN 3.1) It is recommended to expand opportunities for secondments in local or external industrial or medical establishments for faculty members.

E6. (ASIIN 3.3) It is recommended that the scope of laboratory work be broadened to better illustrate the underlying theory, methods, and applications of the medical instruments under study.

E7. (ASIIN 4.1) It is recommended to ensure that the references listed in the module descriptions are consistently kept up to date and include a broader selection of English-language and international literature.

For the Bachelor's programme in Biomedical Engineering

E8. (ASIIN 1.3) It is recommended to further align the curriculum with current developments in biomedical engineering by introducing elective courses in telemedicine and modern non-invasive imaging methods, including CT, MRI, NMR, PET, and AI-based image and signal processing (as EEG, ECG etc.).

E9. (ASIIN 1.3) It is recommended to regularly review and update the module contents in rapidly advancing fields such as robotics, AI, and biosensing in alignment with the programme objectives.

H Comment of the Technical Committee 02 – Electrical Engineering/Information Technology (10.03.2026)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and adopts the experts' assessment without changes.

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

Degree Programme	ASIIN Seal	Accredited by German Engineers	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Biomedical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–
Ba Clinical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–

Requirements

For both degree programmes

A 1. (ASIIN 1.1) Make the training objectives and learning objectives/outcomes accessible for all relevant stakeholders and ensure that the stakeholders can refer to them.

A 2. (ASIIN 1.3) Integrate risk management into quality management.

A 3. (ASIIN 1.4) Colour blindness should not be used as a disqualifying criterion for admission to the study programmes.

A 4. (ASIIN 2) Review examination questions to ensure that they consistently cover the full range of topics defined in the respective module descriptions in order to ensure comprehensive assessment of the intended learning outcomes.

A 5. (ASIIN 2) Ensure that the graduation design (bachelor thesis) consistently includes adequate scientific analysis and critical discussion.

A 6. (ASIIN 2) Include the names of all examiners in the documentation of graduation design (bachelor thesis).

A 7. (ASIIN 4.1) Rewrite the module descriptions so as to include information about person(s) responsible for each module, teaching method(s), credits and workload, intended learning outcomes, date of last amendment, and details explaining how the module mark is calculated for all modules, including the Bachelor thesis.

A 8. (ASIIN 4.2) Revise and adapt the Diploma Supplement according e.g. to the template provided by the European Commission, Council of Europe and UNESCO/CEPES. Characteristics of the study programme, especially the programme learning outcomes; the calculation of the final grade and statistical data need to be part of it.

A 9. (ASIIN 5) Ensure that students are informed about the survey results.

Recommendations

E1. (ASIIN 1.1) It is recommended that the terminology used for the objectives and learning outcomes be standardised and applied consistently across all relevant documents.

E2. (ASIIN 1.3) It is recommended to design and introduce transdisciplinary electives that address emerging interfaces between engineering and medicine.

E3. (ASIIN 1.5) It is recommended that the university refine its student workload survey by introducing more nuanced questions.

E4. (ASIIN 3.1) It is recommended to introduce structured English-language training for faculty members.

E5. (ASIIN 3.1) It is recommended to expand opportunities for secondments in local or external industrial or medical establishments for faculty members.

E6. (ASIIN 3.3) It is recommended that the scope of laboratory work be broadened to better illustrate the underlying theory, methods, and applications of the medical instruments under study.

E7. (ASIIN 4.1) It is recommended to ensure that the references listed in the module descriptions are consistently kept up to date and include a broader selection of English-language and international literature.

For the Bachelor's programme in Biomedical Engineering

E8. (ASIIN 1.3) It is recommended to further align the curriculum with current developments in biomedical engineering by introducing elective courses in telemedicine and

modern non-invasive imaging methods, including CT, MRI, NMR, PET, and AI-based image and signal processing (as EEG, ECG etc.).

E9. (ASIIN 1.3) It is recommended to regularly review and update the module contents in rapidly advancing fields such as robotics, AI, and biosensing in alignment with the programme objectives.

I Decision of the Accreditation Commission (27.03.2026)

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

The AC discusses the procedure and agrees with the assessment of the experts and the responsible TC in most aspects.

In particular, the AC discusses requirement A9. As the results of student surveys are already communicated and published, but are not systematically discussed in class, the AC concludes that a requirement is not necessary. Instead, it decides to downgrade this point to a recommendation to make the survey results more accessible to students and to discuss them in class.

As a result, the total number of requirements is reduced to eight, while the number of recommendations increases to ten. In all other respects, the AC follows the assessment of the experts and the TC.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Accredited by German Engineers	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Biomedical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–
Ba Clinical Engineering	With requirements for one year	With requirements for one year	30.09.2031	–	–

Requirements

For both degree programmes

A 1. (ASIIN 1.1) Make the training objectives and learning objectives/outcomes accessible for all relevant stakeholders and ensure that the stakeholders can refer to them.

A 2. (ASIIN 1.3) Integrate risk management into quality management.

A 3. (ASIIN 1.4) Colour blindness should not be used as a disqualifying criterion for admission to the study programmes.

A 4. (ASIIN 2) Review examination questions to ensure that they consistently cover the full range of topics defined in the respective module descriptions in order to ensure comprehensive assessment of the intended learning outcomes.

A 5. (ASIIN 2) Ensure that the graduation design (bachelor thesis) consistently includes adequate scientific analysis and critical discussion.

A 6. (ASIIN 2) Include the names of all examiners in the documentation of graduation design (bachelor thesis).

A 7. (ASIIN 4.1) Rewrite the module descriptions so as to include information about person(s) responsible for each module, teaching method(s), credits and workload, intended learning outcomes, date of last amendment, and details explaining how the module mark is calculated for all modules, including the Bachelor thesis.

A 8. (ASIIN 4.2) Revise and adapt the Diploma Supplement according e.g. to the template provided by the European Commission, Council of Europe and UNESCO/CEPES. Characteristics of the study programme, especially the programme learning outcomes; the calculation of the final grade and statistical data need to be part of it.

Recommendations

For both degree programmes

E1. (ASIIN 1.1) It is recommended that the terminology used for the objectives and learning outcomes be standardised and applied consistently across all relevant documents.

E2. (ASIIN 1.3) It is recommended to design and introduce transdisciplinary electives that address emerging interfaces between engineering and medicine.

E3. (ASIIN 1.5) It is recommended that the university refine its student workload survey by introducing more nuanced questions.

E4. (ASIIN 3.1) It is recommended to introduce structured English-language training for faculty members.

E5. (ASIIN 3.1) It is recommended to expand opportunities for secondments in local or external industrial or medical establishments for faculty members.

E6. (ASIIN 3.3) It is recommended that the scope of laboratory work be broadened to better illustrate the underlying theory, methods, and applications of the medical instruments under study.

E7. (ASIIN 4.1) It is recommended to ensure that the references listed in the module descriptions are consistently kept up to date and include a broader selection of English-language and international literature.

E8. (ASIIN 5) It is recommended to make the survey results more accessible to the students and to discuss the survey results in class.

For the Bachelor's programme in Biomedical Engineering

E9. (ASIIN 1.3) It is recommended to further align the curriculum with current developments in biomedical engineering by introducing elective courses in telemedicine and modern non-invasive imaging methods, including CT, MRI, NMR, PET, and AI-based image and signal processing (as EEG, ECG etc.).

E10. (ASIIN 1.3) It is recommended to regularly review and update the module contents in rapidly advancing fields such as robotics, AI, and biosensing in alignment with the programme objectives.

Appendix: Learning Objectives and Curricula

The training objectives and learning objectives (intended learning outcomes) for the Bachelor's degree programme Biomedical Engineering based on the SAR are listed below.

Objective 1: To be able to consciously and effectively integrate non-technical factors such as social, health, safety, environmental, and cultural into the solution of complex engineering problems in biomedical software, hardware, and systems; understand and adhere to laws, regulations, and professional ethical standards, and possess values of sustainable development and a sense of social responsibility.

Objective 2: To be able to comprehensively apply knowledge of mathematics, natural sciences, and professional knowledge to analyze engineering problems in the principles, structures, and other engineering aspects of biomedical software, hardware, and systems.

Objective 3: To be able to comprehensively apply professional knowledge and modern tools, possess engineering innovation capabilities, and solve complex engineering problems in the design, development, testing, operation, maintenance and management of biomedical software, hardware, and systems; and be competent in undertaking work in biomedical product research and design, application development, engineering management, technical support, and market promotion.

Objective 4: Possess strong professional ethics, a solid foundation in humanities and sciences, effective communication skills, and a spirit of collaboration; to be able to work as a team member or to organize and lead team collaboration and adapt to different roles.

Objective 5: Possess the ability to adapt to constantly changing domestic and international environments and circumstances; be capable of continuously improving professional competence through continuous learning and self-improvement, and competitiveness in the field of BME, especially in the medical device industry.

Learning Objectives (Knowledge, Skills and Competences) based on the (internal) website:

1) Basic scientific literacy and engineering capabilities

- Through the study of general education courses, possess good humanistic care, social morality, and other humanistic and social science literacy.
- Master the basic knowledge of mathematics, natural sciences, and information

- technology, and have the ability to apply this knowledge and technology to understand, express, and solve engineering problems.
- Ability to understand and participate in job and technical requirements for application systems based on biomedical engineering.
- Understand the development trends and application prospects of modern technology.

2) Professional competencies and capabilities

- Master the basic and professional knowledge of engineering, machinery, mechanics, circuits, electronics, signals and systems, and have the ability to apply engineering and professional knowledge to analyze various engineering phenomena in the field of biomedical engineering.
- Having professional practical skills and abilities to apply engineering knowledge, methods, tools, and techniques to solve practical problems in engineering applications.
- Ability to pursue further education, engage in scientific research, and pursue graduate studies.

3) Engineering thinking and practice ability

- Master the professional knowledge of solving complex engineering problems in the field of biomedical engineering, and possess the thinking ability to apply theoretical knowledge to solve complex problems in biomedical engineering.
- Capable of designing and customizing biomedical engineering solutions, showcasing innovation during the design process while considering social, health, safety, ethical, legal, cultural, economic, and environmental factors.
- Capable of installing, debugging, operating, managing, and maintaining medical equipment according to standards, and able to conduct reasonable analysis and evaluation of actual engineering problems, and provide solutions.

4) Capability in international communication

- Ability to access English major materials.
- The ability to communicate with foreign peers and further study abroad.
- Understand English and foreign cultural backgrounds, and have the ability to work and collaborate in multinational corporations.

5) Team work and management capabilities

- Having a healthy mentality and a complete personality.
- Have good communication skills and teamwork spirit.
- Have good legal awareness and social responsibility.

6) The consciousness and ability of lifelong learning

- Ability to continuously learn new professional knowledge.
- Ability to learn practical engineering skills.
- Have the awareness and ability to engage in lifelong learning of biomedical engineering theory and technology.