ASIIN Accreditation Report

Bachelor's Degree Programme
Optoelectronic Engineering

offered by
University of Shanghai for Science and Technology (USST)

Last update: 28.03.2014

Basic information about the accreditation procedure

Degree programmes	Bachelor's programme Optoelectronic Engineering
Higher Education Institution	University of Shanghai for Science and Technology
Seals applied for	The Higher Education Institution has applied for the following seals and labels: • ASIIN Seal • EUR-ACE® Label
Peer panel	Prof. Dr.-Ing. Walter Anheier, University of Bremen; Prof. Dr.-Ing. habil. Theodor Doll, University of Mainz; Prof. Dr. rer.nat. Andrea Koch, University of Applied Sciences Hildesheim/Holzminden/Göttingen Dr. rer.nat. Alfred Schulte, Robert Bosch Group
ASIIN Procedure Manager	Dr. Siegfried Hermes
On-site visit	The on-site visit took place on 23 and 24 October 2013.

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A Preliminary Remark

The on-site visit for the above mentioned degree programmes took place on 23 and 24 October 2013.

Prior to the talks with the representatives of the university, the peers met to prepare their questions and to discuss the self-assessment report. Professor Anheier was asked to act as speaker of the audit team for the aforementioned degree programmes.

The peers had discussions with the following groups: University management, responsible managers of degree programmes, teaching staff, students, and graduates.

Additionally, the auditors inspected the infrastructure and the technical equipment at Shanghai (USST).

The following chapters relate to the Self Assessment Report (hereinafter SAR) provided in October 2012 as well as to the discussions and information provided during the on-site visit including samples of exams and final theses

The assessment and the award of the ASIIN-seal are always based on the European Standards and Guidelines (ESG) and the Subject-Specific Criteria of Technical Committees 02 – Electrical Engineering and Information Technology of ASIIN as well as on the Subject-Specific Criteria (SSC) of the Technical Committee 05 – Physical Technologies, Materials and Procedures, valid at the time of conclusion of the contract. In case of the award of other seals or labels, the criteria of the respective seal or label-owner (ENAEE) are considered additionally.

As owner of the label ENAEE has authorized ASIIN to award the EUR-ACE® Label based on the „EUR-ACE Framework Standards for the Accreditation of Engineering Programmes". The assessment for the award of the EUR-ACE® Label is based on the General Criteria of ASIIN as well as on the Subject-Specific Criteria (SSC) of the Technical Committees 02 – Electrical Engineering and Information Technology and 05 – Physical Technologies, Materials and Procedures.

The report has the following structure: Chapter B presents the facts which are necessary for the assessment of the requested seals. The information principally stems for the self-assessment report and related appendices provided by the Higher Education Institution. An analysis and separate assessments of the peers about the compliance with the criteria for the requested seals follow. The assessment of the peers is preliminary and subject to changes based the subsequent information. The statement of the HEI is included with the

exact wording. The final recommendation of the peers is drafted after and based on the statement of the HEI (and additional documents, if applicable). The Technical Committees make a proposal for the accreditation decision (chapter F). The final decision is taken by the Accreditation Commission for Degree Programmes (chapter G).

Any gender-specific terms used in this document apply to both women and men.

B Report of the peers (Accreditation Report)

B-1 Formal specifications

a) Name and awarded degree	b) Profile	c) consecutive / further education (for Master's)	d) Study mode	e) Programme Duration & Credit points	f) First & annual enrollment	g) Expected intake	h) Fees
Optoelectronic Engineering / Bachelor in Optoelectronic Engineering	n.a	n.a.	Full time	8 semester 240 ECTS	2005 (under the name Optical Engineering /) Winter term	ca. 120 p.a.	5000,00 RMB p.a. (ca. 625 €)

Evidence/Sources: SAR, audit discussions.

Analysis of the peers:

The name of the degree programme apparently relates to its curricular content and also reflects its intended learning outcomes (see below chapter B-2-2, B-2-6). Study mode, regular duration of study, awarded degree, enrolment provisions, and annually fixed enrolment numbers are all within an ordinary range.

On request, programme coordinators pointed out that students might finish their study in less than eight semesters, but also, on important grounds, are allowed a prolonged duration of study. Reportedly, the Bachelor's programme in Optoelectronic Engineering could be continued in the related Master's programme Optical Engineering, which is also offered by the School of Optical-Electrical and Computer Engineering (OECE). Moreover, there is an option to get a doctoral degree in the field of Optical Engineering.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 1 Formal specifications

The peers judged the formal requirements of the above said criterion as fulfilled.

B-2 Degree Programme: content concept & implementation

B-2-1 Objectives of the degree programme

As **objectives of the degree programme** the institution states the following (SAR, p. 4):

The Bachelor's programme Optoelectronic Engineering "aims to cultivate specialized talents with all-round development, who can also meet the needs of future national development and adapt to advances in technology. Through the education in this programme, they will master related principles as well as knowledge of optoelectronic engineering and receive good training for competent engineers for general optoelectronic project design, construction and management along with solid foundation of theory, sound basic scientific knowledge and outstanding ability of practice. Meanwhile, they will have the ability of continuing learning, innovation, coordination, team spirit and international perspective.

The graduates of this programme in future either will continue their studies in order to become scientific experts or will enter leading positions in industry or administration with abilities of research, design, development, application and management in the areas of photoelectric information technology, optical engineering, information science and technology. Even they can become experts in other related professional fields and disciplines because of effective learning in the university with the solid knowledge base and high education quality."

The proclaimed study objectives *aren't yet* published in such manner that the relevant stakeholders – with students in the first instance – might be able to refer to them.

B-2-2 Learning outcomes of the programme

As **intended learning outcomes of the degree programme** the institution states (SAR, pp. 4–8, here particularly p. 8):

1) Development of team spirit and social competence

- Ability to be productive in a multi-disciplinary team;
- Understanding of ethical and social responsibilities;
- Applying the theoretical knowledge into practical excise;
- Learning how to keep good cooperation with colleagues;

- Cultivating good Personality and characteristics

2) Development of intercultural competence, competence for international employment

- Ability to present ideas in writing, expressing orally, and to communicate effectively in an international environment

3) Broad education in natural sciences and mathematics

- Knowledge of mathematics, physics and basic mechanical knowledge
- Ability to apply nature and science knowledge to solve engineering problems

4) Broad education in Computer Science and Engineering Skills; Development of professional skills in the scientific computer and its application field

- Knowledge of engineering sciences and engineering
- Know-how to solve engineering problems
- Ability to apply computer knowledge to opto-electronic design

5) Broad education in optics and related advanced optical technology; Ability for development work in optics, optical system design and advanced optical technologies

- Knowledge of theoretical optics and applied optics
- Knowledge of opto-electronics and advanced optics
- Ability to design, conduct and evaluate the results of optical and optical-related systems
- Ability to design and evaluate optical and optic-electronic experiments and related systems
- Ability to formulate and solve engineering problems within the optical and photo-electrical field

6) Broad education in electronics, electronic circuits and the related advanced measurement and controlling technology

- Knowledge of the basic electronics, advanced technology within the electronic field
- Ability to design, conduct and evaluate general circuits system within practical opto-electronical system
- Ability to formulate and evaluate the processing and results in electronical measurement, and controlling aspects
- Ability to formulate and solve engineering problems within the opto-electronical system

7) Broad education in opto-electrical engineering and information engineering with an in depth education in selected topics

- Knowledge of the advanced technology within the optical-electrical and information engineering field
- Primary ability to solve the complex tasks of advanced optical-electrical systems

8) Development of thinking creatively and researching sources of information for the purpose of solving engineering problems

- Ability to work independently
- Ability to design a system, component, or process.

The intended learning outcomes *aren't yet* published in such manner that the relevant stakeholders – with students in the first instance – might be able to refer to them.

Evidence/Sources: SAR, audit discussions, lecture materials, samples of exams and graduation works presented during the onsite-visit.

Analysis of the peers:

The higher education institution (HEI) has, on principle, duly classified the final degree in academic and professional terms. This becomes clear from the study objectives the HEI has defined for the Optoelectronic Engineering- Bachelor's degree programme, which by and large can be allocated to the Bachelor's level of the European Qualifications Framework (EQF).

In line with this, as has been indicated above, the intended learning outcomes do not only reflect the name of the programme but also match up with the curriculum design and thereby the qualification sought. In particular, these learning outcomes are fitting together with the engineering-specific parts of the Subject-specific Criteria (SSC) of the related Technical Committees Electrical Engineering and Information Technology (02) and Physical Technologies, Materials and Processes (05). Thus, it seems realistic and plausible with regard to the curriculum that crucial engineering analysis and engineering design skills / competences in the optoelectronic field, which have been broadly framed in the above cited learning objectives/intended learning outcomes, could be acquired in the mandatory modules Optical Communication, Laser Technology, Optoelectronics, Modern Optics, Technical Optics, Basic Electronics, Electric Circuits, Microcontroller, and Measurement and Sensor. Similarly, important learning objectives related to the Engineering

Practice-field might quite possibly be achieved not only while doing accompanying laboratorial experiments but rather more so during the Enterprise Practice and through conducting the graduation work. In a similar vein some of the required courses of the Ministry of Education, or the College and Technical English courses, may be related to the "Transferable Skills"-section, as may be the case with the Enterprise Practice and the Final Thesis in regard to the "Investigations / Assessment"-category.

On inquiry, so-called Soft Skills like scientific writing, presentations of working results, project management skills and competences etc. have been largely attributed by programme coordinators to projects, an optical project in particular, and the final thesis. In these works students are supposed to take responsibility for one or more parts of the project (management-, reporting- and presentation-tasks). Team competences are primarily addressed in the laboratory courses. According to the HEI, social competences in a wider sense could also be acquired during the Enterprise practice as well as in (extra-curricular) disciplinary related competitions students are encouraged to participate throughout.

Apparently, the HEI inquires and takes into account the input of relevant stakeholders like industrial companies, students, graduates in the defining and revising stages of the cited learning objectives/outcomes (as in the corresponding processes of the curriculum design).

Of course, the study objectives and intended learning outcomes referred to above at present seem only to be communicated within the SAR, but not yet published in an authoritative manner. Thus, it is altogether impossible for the primary stakeholders – students and teachers – to refer to them, say, for instance, in the course of the internal quality assurance processes.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 2.1 Objectives of the degree programme
Criterion 2.2 Learning outcomes of the programme

The peers considered the requirements of the above mentioned criteria as fulfilled for the most part. However, they deemed it necessary that the study objectives and learning outcomes for the degree programme be authoritatively published and made accessible to students and teachers in such manner that they may refer to it (for instance, in the course of the internal quality assurance processes).

Assessment for the award of the EUR-ACE® Label:

The peers deemed that the intended learning outcomes of the degree programme under review do comply by and large with the engineering specific parts of the Subject-Specific Criteria of the Technical Committees *Electrical Engineering and Information Technology* and those of the Technical Committee *Physical Technologies, Materials and Procedures* as well. Learning outcomes in the categories „Knowledge and Understanding“, „Engineering Analysis“, „Engineering Design“, „Investigations“, „Engineering Practice“ und „Transferable Skills“ have been addressed appropriately.

B-2-3 Learning outcomes of the modules/module objectives

The **objectives of individual modules** are published in the module descriptions. These are available to students in the in a so-called Course Guide.

Evidence/Sources: Module handbook, “Course Guide” for students (during the onsite-visit).

Analysis of the peers:

All in all, the module descriptions are aimed at giving a reasonable idea of how the learning objectives stated for the degree programme as a whole (in the sense of knowledge, skills and competences) have been systematically translated into learning outcomes on the module level. In connection with this and taking into account the content of each module, these descriptions also clarify how these combined learning outcomes are operated in the curriculum of the Optoelectronic Engineering-programme. Nevertheless, in a string of descriptions, the defined learning outcomes do predominantly refer to knowledge (in the narrow sense) and/or skills/abilities, and only at rare instances to such *competences* the modules might be conceived imparting as well. To be sure: By far not all modules must be aiming at altogether all of the learning categories (knowledge, skills and competences). But there is a row of competences that – according to the HEI – students are considered to dispose after completing their study. And thus, the module descriptions need to shed light on how this is going to be achieved. That way, *competences* that can be assumed as learning outcomes of a specific module, when taking into account the module’s content, need to be addressed adequately.

On the other hand, there are many module descriptions whose specifications of content appear to be rather comprehensive and encompassing, both in relation to the intended learning outcomes and to the credits allocated for the respective module or course.

Furthermore, the descriptions at hand rarely bring out the non-technical skills and competences the students are supposed to acquire, which have been referred to already in the previous chapter.

Apart from that, the module descriptions generally do not substantiate the ratio of lectures, exercises, labs in each module, as they omit information about its constituent courses. Also, the respective teaching language (Chinese and/or English) of the modules/courses has generally not been mentioned. As to the latter, it has been pointed out that the Optical-Electrical and Computer Engineering-School is willing to provide an ever-growing number of modules in English language (as part of its internationalization strategy). The Bachelor's programme in Optoelectronic Engineering is named among those programmes being designed and staffed according to this strategy in the first place.

Finally, the module descriptions of a string of modules are simply missing in the module handbook presented as part of the SAR (modules general courses, internship, graduation work / Bachelor Thesis).

Apparently, the "module handbook" itself has been explicitly prepared for the purpose of the accreditation procedure, while not being available for the relevant stakeholders (students and teachers in the first place) at present. There is a "Course Guide" providing students with the most relevant study-related information. However, not "courses" but "modules" (at times consisting of several courses) should be referred to as the constitutive teaching and learning units of the study programme. And therefore "modules" should matter with regard to descriptions and first hand information for students.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 2.3 Learning outcomes of the modules/module objectives

The peers deemed the requirements of the above mentioned criterion as not fully matched so far. From their point of view, the module descriptions need to be revised in the further course of the procedure, thereby taking into account the above-mentioned shortcomings. Having done this revision, the HEI should also make sure that these module descriptions are available to both students and teaching staff.

B-2-4 Job market perspectives and practical relevance

The HEI mentions the following job perspectives for the graduates:

- Significant increase of demand for technicians in optoelectronic fields because of rapid growth in the number and complexity of optics and photonics-enabled technologies;
- Henceforth: employment opportunities in different branches of industry and business, in particular related to optical and optoelectronic products, optical communication and information technology.

Practical relevance of the programmes shall be achieved by:

- lab courses;
- students' project;
- industrial internship;
- metal working practice;
- guest lectures by engineering practitioners;
- establishment of internship training bases successively within the Shanghai Industrial Automation Instrument Research Institute, Golden Family Group, Shanghai General Machinery Company, Shanghai Wide Extension of Information Technology Ltd., Ding Jie Software Ltd. by Share Ltd. and other 36 enterprises;
- international and domestic academic seminars and workshops to provide more chances for the students to contact with enterprises from industry.

Industrial Internship

During the *industrial internship*, tutors are in charge of supervising, counselling and supporting students. They are responsible for knowing the unit, content, schedule and other information about students' internship, and for providing assistance to students when they encounter difficulties in the course of practice. According to the respective regulation, tutors shall also have at least one on-the-spot investigation on the practice unit of each student. After the end of internship, the tutor shall fill out for his or her student a 'Comprehensive Evaluation of Performance' on 'Professional & Comprehensive Skill Internship', which should fully illustrate the basic situation of the internship unit as well as the internship performance of the student.

Evidence/Sources: SAR; audit discussions; module handbook; student "Course Guide", "Rules for Managing Undergraduates' Practical Course Teaching Process for University of Shanghai for Science and Technology", USST Teaching Article No. 7, 2011; "Instructions on Implementation and Management of 'Professional & Comprehensive Skill Internship' for

Undergraduates" (USST OECE, No. 12, 2013); "Opinions about Employment for Undergraduates of OECE", USST OECE, No. 13, 2013.

Analysis of the peers:

It can be assumed from the information at hand that there is a significant demand on the labour market for graduates of the programme. The overall impression is that close ties with many companies in the optoelectronic field allow the HEI and OECE respectively to further develop the programme along the lines of the technological demands of the regional industrial employers, while also providing manifold opportunities to carry out an Enterprise Practice as part of the curriculum. Reportedly – as has been referred to in a previous chapter –, the companies are explicitly requested suggesting further developments of the programme according to newly arising technological demands. This could reasonably support the OECE in keeping its study programmes, and in particular the programme under consideration, on track with the latest technological developments and demands in the Optoelectronic field of training and research.

Generally, the practical training offered (projects, laboratories and industrial placements) is appropriately linked to professional practice. In particular, as students, teachers and programme coordinators concurrently confirm, practical training in industrial enterprises is supervised commonly by the HEI and the company. Students can freely choose a company they consider best suited to conduct an industrial internship; but on request they also get support from OECE in finding a company matching their individual purposes. The supervising professors of the OECE are, as a rule, supposed to visit the company which offers places for industrial internships, thus ensuring that the student apprentice really conducts engineering-related tasks and acquires skills and competences which have been foreseen as learning outcomes in the Enterprise Practice-module. Students are required to prove the achievement of these skills/competences through reporting about their experiences during the internship, and presenting the results in front of their fellow students. This has been independently confirmed by the programme coordinators, teachers and students too.

However, with regard to the practical training experienced in laboratorial experiments, it has been observed that the experiments are very narrowly specified and almost entirely planned, leaving barely any incentive to or room for self-assertive and proactive action of students which, otherwise, may be considered extremely important for any evaluation- and design-related task, not least in the framework of the graduation work.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 2.4 Job market perspectives and practical relevance

On principle, the peers judged the above mentioned criterion and its related items as largely fulfilled. Nevertheless, they recommended further enhancing the students' competence to design and conduct experimental laboratory work. To them, this would seem especially worthwhile with respect to carrying through the graduation work (Bachelor thesis).

B-2-5 Admissions and entry requirements

As to the admission and entry requirements, the following principles do prevail and are outlined in the SAR:

- USST belongs to the nearly 100 second level HEIs mainly administered by provinces or municipalities as *key universities*. Colleges and universities in first or second level have the priority to choose candidate students with higher scores in National Higher Education Entrance Examination (NHEEE).
- Identification and stipulation of admission numbers are coordinated between the Shanghai Municipal Education Commission and the HEI.
- Applicants need to meet the Article 19 of Higher Education Law of the People's Republic of China: That is to say, graduates of senior secondary school education or those with equivalent educational level shall, upon passing the NHEEE, be admitted by institutions of HEIs and meet the requirements for admission as undergraduate students.
- Because of its national status, the annual enrollment scores of the HEI is said to rank relatively high. If the number of applicants is higher than the number of the annually fixed places of enrollment, students are enrolled into the majors according to their individual scores.
- Almost all applicants need to take the NHEEE after their 3-year high school study. There are several examination systems in China like "3+x" or "3+1+x" or "4+x", and so on. Different provincial-level educational authorities could choose different system as their NHEEE models. "3+x" is a pilot examination system implemented in most provinces. Where "3" refers to compulsory subjects, including "Chinese, Mathematics and English", and "x" means that students can choose, according to their own interests, one or two subjects from either arts subjects (Politics, History and Geography), or science subjects (Biology, Physics and Chemistry). The maximum score for this system is 750 (two subjects in "x" are chosen). "3+1+x" is different from "3+x" with a comprehensive ability test added. It's mainly implemented in Shanghai and its full score is 630.

- Students could then choose some universities or colleges as their application target according to their scores. The national key universities (first level universities) always choose applicant students at first. Then it's the turn of universities or colleges at second level, followed by those at third level.
- Winning prices in various competitive (cultural or communal) events might, according to the prevailing regulation, be awarded a slightly improved score.
- The admission cutting score is different from year to year or province to province, since the number of applicants varies but the admission quota for each province is usually fixed (see above).
- According to the SAR, the whole admission procedure is official and transparent and under the supervision of the public. The admission cutting score is said to be announced through media such as TV, internet or newspaper. Applicants or anyone who have interest could look up the enrolment information or admission notice or admission process about universities and colleges through websites. Applicants could also ask for verification from Shanghai municipal administrators or even the State Education Commission when assuming unfair treatment.
- Reportedly, since the year 2000 students in USST could apply for changing the major after the first year study. In Optoelectronic Engineering, allegedly one of the most sought majors in USST, there is a long waiting list every year. Students who have performed better in physics and mathematics in first year's study are said to be considered first for admission.

Evidence/Sources: SAR; Overview about College Entrance Examination Process; "2013 Shanghai Institutions of Higher Learning Admission Regulations Approval Record Table", Notice Issued by General Office of Ministry of Education on 2013 National Institutions of Higher Learning Admission Work", Ministry of Education, Education Department, No. 6, 2013; "Notice Issued by Shanghai Municipal Education Commission on 2013 Shanghai Institutions of Higher Learning Admission Work", Education Commission (Shanghai), No. 13, 2013; "Notice Issued by Shanghai Municipal Education Commission and Shanghai Municipal Development and Reform Commission on 2013 Shanghai Institutions of Higher Learning Admission Plan", Education Commission (Shanghai), No. 140, 2013.

Analysis of the peers:

Following up the audit visit, a string of provisions, rules, guidelines and documents concerning inter alia the admission to the Bachelor's programme Optoelectronic Engineering has been provided on request of the peers.

The admission rules generally illustrate the overarching reliance on the applicants' NHEEE-scores and a predominant focus on the achievements in mathematics and natural

sciences which, in turn, doesn't come unexpected with a view to the specialty. Apparently, these criteria are adopted in an admission area sharply restrained by annually fixed enrolment numbers according to regional and central regulation. With a view to the extraordinary completion rate of students, one might conclude that the admission procedure contributes to the achievement of the intended learning outcomes of the degree programme and the overall quality of training as well.

Moreover, it can be acknowledged from the information available that the OECE apparently makes every effort to support students' progress in their respective specialty. One of those measures is an already established tutorial system that, inter alia, has the purpose to closely review students' progress in order to identify weaknesses and deficiencies at the earliest possible stage. Another more specific one is the "practical design training", which in fact is an optional part of the curriculum, mostly embedded in research projects of members of the teaching staff. As a matter of fact, students are strongly recommended to participate in this training, which reportedly is fostered, inter alia, by University grants.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 2.5 Admission and entry requirements

The peers considered the admission rules and entry requirements to meet the accreditation standards. Apparently, these provisions and regulations facilitate on their part the achievement of the intended learning outcomes. They therefore ensure that students admitted possess the required knowledge, skills and competences and formal training.

B-2-6 Curriculum/content

Curriculum "Optoelectronic Engineering"

Module Name	Course			S1		S2		S3		S4		S5		S6		S7		S8		
	Course Name		Type	ECTS	Hour	ECTS	Hour	ECTS	Hour	ECTS	Hour	ECTS	Hour	ECTS	Hour	ECTS	Hour	ECTS	Hour	
Language Teaching	College English(1-4)		L	2	64	2	64	2	64	2	64									
	Technical English Reading		L					2	64											
	Intermediate Interpretation of Technical English		L							1	32									
General Course	Ideological,Moral Cultivation and Basic Law		L	1	32															
	Outline of Chinese Modern and Contemporary History		L	1	32															
	An Introduction to Basic Principle of Marxism		L	1	32															
	MAO Zedong Thought and Chinese Characteristic Socialism Theory System Introduction		L	1.5	48															
	Social Practice		P	1	32															
	Military Knowledge		L	1	32															
	Military Training		P	1	2W															
	Physical Education(1-4)		P	1	32	1	32	1	32	1	32									
	Industrial Management and Economics		L													2	32			
	Production Plan and Control		L															2	32	
Basic Mathematics A	Linear Algebra		L					2	32											
	Calculus(1-2)		L	6	96	6	96													
Basic Mathematics B	Stochastic (Prob. and Statistics)		L							3	48									
	Compl.Funct.Integr.Tr.		L									2	32							
Physics	College Physics A（1-2）		L	4	64	4	64													
	College Physics Experiment（1-2）		P	1	18	1	18													
Computer Science	Information Technology		L	2	32															
	Information Technology Experiment		P	1	16															
	Program Design and Practice（C）		L			4	48													
	Program Design and Practice（C）Experiment		P			1	16													
	Advanced Program Development and Application B		L									2	32							
	Advanced Program Experiment		P									1	16							
	Engineering Drawing Foundation (1-2)		L	4	48	4	48													
Microcontroller	Microcontroller and its Application (1-2)		L							4	64	4	64							
	Microcontroller I Experiment (1-2)		P							1	16	2	32							
	FPGA and its Application		L											2	32					
	Microcontroller II Design		P									2	2 w							
Technical Optics	Optical Engineering（1-2）		L					4	64	4	64									
	Lab Applied Optics(1-2)		P					1	16	1	16									
	Optical System Simulation with Software		L									2	32							
Electronics	Analog Electronic Tech.		L					6	64											
	Digital Electronic Tech.		L							6	64									
	Lab Analog Electronic Tech.		P					2	32											
	Lab Digital Electronic Tech.		P							2	32									
Electric Circuits	Electrotechnics Foundation		L			4.5	48													
	Circuit Principles(1-2)		L					3	48	3	48									
	Lab Circuit Principles(1-2)		P					1	16	1	16									
Optoelectronics	Optoelectronic Principles		L											4	64					
	Optoelectron. Devices		L											4	64					
	Lab Optoelectronics		P											2	32					
Laser Technology	Laser Technology		L									4	64							
	Laser Lab.		P									2	32							
Optical Commun.	Fiber Optics and Opt. Comm.		L									4	64							
	Lab. Opt. Comm.		P									2	32							
Modern optics	Optical Information Processing		L											4	64					
	Computer Aided Optical Design		L							3	48									
	Lab. Optical Design		P											2	2W					
	Academic Seminar		L											2	32					
Measurem. and Sensor	Signals and Systems		L					4	64											
	Nanometrology		L											2	32					
	Weak Signal Detection		L											2	32					
Specialities Optoelectr. (Elective Course)	Course Name	CP	H.																	
	Image Processing	2	32	L																
	Photovoltaic Tech.	2	32	L																
	Measurement and Control Circuits	2	32	L																
	Infrared Technology	2	32	L																
	Thin Film Technology	2	32	L																
	Modern IlluminationTechnology	2	32	L								6		4						
	Optical Information Network	2	32	L																
	Integrated Circuit Manufacturing Tech.	2	32	L																
	The Photoelectron Emitting and Display	2	32	L																
	Biological Optical Measurement	2	32	L																
Enterprise Practice	Metalworking Practice			P			3	3W												
	Internship			P												26	15W			
	Seminar on Internship			P												2	32			
	Lab. +Workshop Train.			P														4	48	
	Student's Project			P														8	4W	
Final Thesis	Bachelor Thesis			P														16	12W	SUM
SUM					28.5		30.5		28		32		33		28		30		30	240

(L-Lecture, P-Practice, S-Semester,W-Week)

Evidence/Sources: Curriculum; study plan.

Analysis of the peers:

Overall, the curriculum corresponds to the intended learning outcomes referred to in chapter B-2-2. This way, it can be assumed that the disciplinary content and combination of modules are contributing to the achievement of the learning outcomes. Furthermore, the individual modules appear also to be coordinated so as to avoid unintended overlaps. This could be derived from the curriculum despite of the already mentioned fact that quite a few module descriptions consist of unrealistic wide-ranging specifications of content (as to that see chapter B-2-3).

Considering the first year of study, which is largely devoted to cross-disciplinary educational units like Technical English Reading, Ideological, Moral Cultivation and Basic Law, Outline of Chinese Modern and Contemporary History etc., and, besides, to the foundations of Mathematics and Natural Sciences, it seems reasonable enough to allow (under certain restrictions) for the students' change of specialty. Given that the basic modules of the specialty start from the third semester onwards, such change of specialty, which turns out to be a real option for many students, might even positively correlate with the duration of study.

As has been indicated in a previous chapter of this report (B-2-2), the most important engineering-related parts of the SSC of the Technical Committees *Electrical Engineering and Information Technology* and *Physical Technologies, Materials and Processes* respectively have been adequately addressed in the curriculum, as far as can be judged from the information available and the oral discussions during the onsite-visit. Corresponding learning outcomes and modules have been named explicitly for the "Engineering Analysis"-, "Engineering Design"- and "Engineering Practice"-categories, but also for the "Transferable Skills"- and the "Investigations / Assessment"-category.

Although, with regard to the skills and competences within the field of Engineering Practice, it has been observed that the lab experiment design so far seems to be, in most cases, rather narrowly shaped, thus severely restricting self-assertive and responsible student action in framing and conducting experiments and in developing individual engineering solutions (in electronics hardware, for instance).

Assessment of the peers:

For the award of the ASIIN seal

Criterion 2.6 Curriculum/content

The peer found the curriculum of the Bachelor's programme of Optoelectronic Engineering to be generally convincing. In particular, they acknowledged the sound education students receive in Natural Sciences and Engineering fundamentals. The Peers therefore judged the requirements for the above-said criterion as satisfactorily fulfilled.

However, with a view to the students' competence to work professionally and scientifically as well, they at the same time recommended further enhancing the students' competence to design and conduct experimental laboratory work.

For the award of the EUR-ACE® Label:

The peers deemed that the curricular content is generally suitable to achieve the required learning outcomes. Nevertheless, for the reasons just stated above they recommended further enhancing the students' competence to design and conduct experimental laboratory work.

B-3 Degree programme: structures, methods and implementation

B-3-1 Structure and modularity

- The size of the modules („courses") ranges between 5 ECTS (module *Basic Mathematics B*) and 19 ECTS (module *Computer Science*). The modules *Microcontroller* and *Electronics* also show up as really big modules (15 and 16 ECTS respectively).
- A rash of modules is stretching over 3 semesters, or, though conceptually divided into several parts, scheduled in non-consecutive semesters (e.g. modules *Computer Science* (sem 1, 2, 5) *Microcontroller* (sem 4–6), *Technical Optics* (sem 3–5) *Electrical Circuits* (sem 2–4), *Modern Optics* (sem 4, 6))
- The industrial internship is awarded altogether 26 ECTS (with additional 2 ECTS for a related *Seminar on Internship*).
- Moreover, there is a Student's Project planned in semester 8 and credited with 8 ECTS, along with a Bachelor's Thesis of 16 ECTS.

Internationalization / Mobility of students

In its internationalization strategy, the HEI commits itself to encouraging teachers to provide courses taught in English. As a rule, newly recruited teachers (including those recruited by the graduate school) shall provide at least one course taught in English. And

according to the HEI, some professional courses have already been taught bilingual or fully in English (as to that, SAR lists the modules/courses Nanometrology, Photoelectric Detection, Optical Processing, Integrated Circuit Fabrication Technology).

Representatives of the HEI pointed out that the School of Optical-Electrical and Computer Engineering (OECE) has concluded cooperation agreements with universities particularly in Europe and the United States, often by stipulating joint degree programmes. It also declares the exchange of students as one of the pivotal points of its internationalization strategy. As to this, the HEI exemplarily refers to the joint programmes already established with Coburg University of Applied Sciences. In line with this, the English skills of students have been described by representatives of the HEI as a focus of the curriculum being reflected in the College English- and Technical English Courses in semester 1 to 4.

Rules for recognition of activities completed externally

The HEI regulates the conditions for the recognition of academic activities students of USST wish to perform abroad, or foreign students enrolled in specialties at USST do want to transfer. On principle, the relevant aspects of the acknowledgement like, level, specialty, content, individual study requirements etc. are all subject to an “exchange project agreement” between USST and its partner universities.

Article 2 and 3 of the “Management Regulations of Course Grades and Credit Authentication for Undergraduates of USST Studying in other Universities” read as follows:

(2) “Credit authentication and transfer is handled on basis of syllabus or course introduction of universities from both own sides. If courses of universities outside USST are the same as or similar to the courses of USST (similar rate of course content is over 80% and the credits should be more than two-thirds of the corresponding curricular credits in USST), those credit points earned by students are allowed to be verified and transferred in the corresponding course code, name and credit record adopted by USST. If a student achieved a final course credit in [an]other university which is higher than the corresponding course credits of USST, the protruding part cannot be converted to credits of other courses of USST. If the credit point achieved by students from other universities is less than one credit, it can be mostly transferred for one corresponding USST credit.

(3) When the courses in other universities are different from USST, with students’ application the school identifies [the] course attribute as general education course, specialty foundation course, specialized course and optional course, and corresponding course modules according to the course contents that the student has taken and the graduates training plan of USST. After gaining the approval of the academic affairs office, the grades

and credits will be recorded as the course name of off-campus universities which should be attached with both Chinese and English course name at the same time and the credits which are coded into USST's course database. Credits of these courses are limited to be recorded no morethan4 professional credits."

Evidence/Sources: SAR; Curriculum; "Management Regulations of Full-time Students' Study Status under Credit System", USST Article No. 102, 2009; "Management Regulations for Study Status of International/Foreign Exchange Undergraduates"; "Management Regulations of Course Grades and Credit Authentication for Undergraduates of USST Studying in other Universities", April 2012; "Opinions on Improving Internationalized Education of OECE", USST OECE, No. 04, 2011.

Analysis of the peers:

Overall, the modules constitute coherent and consistent components of teaching and learning. Thus, each module usually consists of different didactic elements such as theoretical lectures and practical elements in subject related laboratories of the OECE. This general impression notwithstanding, the programme coordinators' comments on the modularization of certain modules conveyed a rather formal understanding of the idea of modularization. Only in a few cases, however, does this lead to an outright misleading integration of teaching / learning units into "modules" that are barely more than compositions of topic-related, let alone truly interlinked teaching / learning units. This is especially the case when considering the modules "Computer Science" and "Electric Circuits". In fact, these modules are assembled through units which are partly subject-specific and independent, partly loosely subject-related, but in no meaningful way combine to reasonable "modules". In contrast, the big modules *Microcontroller* (15 ECTS) and *Electronics* (16 ECTS) aren't inherently problematic. In fact, they do integrate to topically plausible modules, while the assessment method for these modules (constituent parts of the modules are assessed separately) at the same time contributes to achieving the defined learning outcomes and the feasibility to pass the module at all. However, the module *Microcontroller* turns out to be not only a large one, but also one lasting altogether three semesters.

The fact that a string of modules stretches over three semesters or are composed of courses not taught in consecutive semesters might also be traced to a more formal understanding of modularization. Consequently, the mobility of students could easily be hampered since the recognition of those modules and the awarding of credit points as a rule depend on successfully completing them.

With respect to the modularization, it has been observed that the composition of modules is somewhat blurred in the module descriptions, since the constituent parts of each module ("courses") can only be derived from the content and assessment columns respectively.

It could be seen from the SAR and the comments of the HEI during the audit discussions that there are some already existing cooperation agreements with international universities. The large-scale exchange of both teachers and students figures as quite another core element of the internationalization strategy of USST. Providing a good deal of modules in English language and, correspondingly, strengthening the English language skills of students and teachers alike should complement this international outlook from the perspective of the HEI. At this stage however, the English language skills of both teachers and students appear to be limited at best, as far as could be judged from the audit talks.

Concerning the rules for recognition, the representatives of the HEI and also the students generally confirm the rules cited above. However, much seems to depend on a formal partnership agreement specifically governing the exchange of students and the transfer of credits. And what is more, the existing rules of recognition nearly exclusively refer to the *course content* at the basis of any credit transfer, thus omitting the acknowledgement of the respective *learning outcomes* which might well be achieved in spite of differences in the content of courses to be recognized.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 3.1 Structure and modularity

The peers concluded that the requirements of the above-mentioned criterion aren't met yet. As has been argued, they found it necessary to revise the modules "Computer Science" and "Electric Circuits" with respect to their conceptual design as coherent and consistent teaching and learning units.

In this connection, the module descriptions need to more clearly name the "courses" as constituent parts of the respective module.

Additionally, the peers considered it commendable that modules with a duration of altogether three semesters or comprised of courses, which aren't taught in consecutive semesters, be adapted so as to allow for a more flexible combination of modules as well as to facilitate the transfer of credits.

Regarding the rules of recognition of modules completed at external HEIs (universities abroad, in particular), the peers stipulated an adaptation in such manner that they more aptly reflect the respective learning achievements and, thereby, also encourage and facilitate the mobility of students.

Finally, with a view to internationalization, the peers recommended that already existing efforts to improve English language skills and to offer English-medium courses in the curriculum should be strengthened. In that respect, they also strongly support all efforts to cooperate with (international) HEIs.

B-3-2 Workload and credit points

- According to the institution, each learning outcome is expressed in terms of credit points, with a student workload ranging from 1,500 to 1,800 hours for an academic year, and 1 ECTS generally corresponding to 25-30 hours of work. In this self study report, one ECTS corresponds to 27 hours.
- 1 credit point in Chinese teaching system corresponds to 16 teaching lessons and each teaching lesson is equal to 45 minutes, while 1 ECTS requires students to study for 27 hours, including 12 hours for teaching and 15 hours for self-study.
- For the general courses, 1 ECTS requires 16 teaching lessons, i. e. 12 hours, while 1 ECTS in some courses like physical education corresponds to 32 “teaching lessons”, given that these courses are relatively easier to learn, and there is less self-study time and almost all lessons are for “teaching in class”.
- In other courses like Engineering Drawing Foundation (1-2), 1 ECTS credit corresponds to 12 teaching lessons for the reason that these courses require much more time for self-study. And 1 ECTS credit in some courses like College Physics Experiment (1-2) corresponds to 18 teaching lessons for the reason that these are experiment courses and require much more time in class for doing experiments.
- Each semester between 28 and 33 ECTS are awarded.

Industrial Internship

- The industrial internship (“Enterprise practice”) is, as mentioned above, awarded 26 ECTS. The awarding of credits requires the students’ submitting a report about their engineering- and discipline-related activities during the internship, and also passing an oral examination on this practice.
- The grade is decided by the advisor from a comprehensive evaluation on average performance, company evaluation and marks of the oral examination.

Evidence/sources: SAR; Curriculum; “Rules on Undergraduate Program Reform for Students Admitted in Year 2010”, USST OECE, No. 15, 2010; “Instructions on Implementation and Management of ‘Professional & Comprehensive Skill Internship’ for Undergraduates”, USST OECE, No.12, 2013.

Analysis of the peers:

The HEI has put in place a credit point system. It also has transferred the Chinese credit point system into an ECTS-compatible system, thereby drawing from experiences with joint programmes the HEI maintains, inter alia, with German HEIs. The utilization of the credit point system indicates a detailed workload planning in order to allocate ECTS credits to the lectures, practical sessions and self-study periods of the modules. On request, students confirmed the workload calculation at the basis of the credit point allocation as principally matching their actual workload.

Regarding this, it is noteworthy that the credit point allocation demonstrates the HEI’s effort to reflect the real student workload in relation to the respective course content and demands of learning. That way, 1 credit point corresponds to varying numbers of hours of student workload depending on the assumed intensity of learning for the respective module/course.

The award of credits for the Enterprise Practice (Industrial Internship) results from delivering a report about the engineering-related activities during the internship in writing and in an oral presentation, as students confirmed in the audit talks.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 3.2 Workload and credit points

The peers deemed the requirements of the above-said criterion as fulfilled. Nevertheless, they suggested including mechanisms in the quality management system in order to continually verify whether the estimated workload matches the actual workload of the students.

B-3-3 Educational methods

According to the self-assessment report, the following educational methods are in use: Lecture, laboratory practice (experimental), practical project, industrial practice (“Enter-

prise Practice"), graduation work ("Bachelor Thesis") are the main teaching and learning forms.

In general, the above mentioned didactical elements represent an ever growing importance of the self study part of students work. In this context, the HEI reportedly has tried to adequately consider this in the framework of its workload calculation for each module (as described in the previous chapter).

Elective modules are available: In the 5th and 6th semester respectively, the students are required to choose subject-related electives out of a catalogue of electives (altogether 10 ECTS, in fact equating to 5 electives out of a catalogue of 10; see above chapter B-2-6).

Evidence/Sources: SAR; audit discussions; curriculum.

Analysis of the peers:

Overall, the teaching methods used for implementing the didactical concept seem to be appropriate to support the attainment of the learning objectives. Students favourably referred to electronic devices provided by the HEI to support their learning efforts (like multimedia equipment, web technologies, computer technologies for doing laboratory works etc.). It is also noteworthy that, according to indications of the programme coordinators, the key laboratories are, but with consultation, principally open to students and teachers in order to encourage independent scientific and research work.

In general, a fair ratio of contact hours to self study seems to be implemented in the study programmes contributing to the achievement of the defined objectives.

The proposed catalogue of electives (to be elected in the 5th and 6th semester) provides students with the opportunity to develop an individual focus in the disciplinary field of optoelectronic engineering.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 3.3 educational methods

The peers considered the educational methods matching the requirements of the said criterion.

B-3-4 Support and advice

Offers for support and counselling of students are provided as described below:

- *Student counsellors*: support students in completing their studies and developing interpersonal and leadership skills, initiate and assist in career planning activities, in particular for the sophomore and junior students; every grade disposes of three full-time counsellors.
- *Student affair centre*: comprehensive guidance and service on life, study, employment and community activities, etc.; it also is responsible for the organization of the Alumni association, i.e. inviting famous Alumni majored in optoelectronic engineering to give lectures for the undergraduate students; additionally, internship employment guidance: arrangement for contact practice base.
- *Alumni association*: information about companies in which alumni are employed, working conditions, professional fields of activity and required competences;
- *Tutorial system for undergraduates:* A tutor appointed to every five students; should be a teaching staff member (including laboratory teachers) who has an intermediate professional title or a doctorate degree (or a higher degree). Others (e.g. laboratory teachers who do not have an intermediate professional title or a doctorate degree or a higher degree) can also be appointed as tutors after their qualifications being recognized and confirmed. The selection and allocation of tutors should be carried out during the second term of the freshman year. Sophomores, juniors and seniors have to be managed by tutors.
    - As a rule, selection of tutors by students should be carried out in a two-way mode within each specialty and finalized by the School. No change is allowed once the decision is made. At the stages of students' internship and graduation project design, new tutors can be appointed if there are adequate reasons. The new appointment should gain approval from both the former and new tutors and be put on file by the School (at the stage of topic selection).
    - Together with the programme coordinator ("principal") of each major and the tutors, heads of both department and Teaching & Research office should, on the basis of the characteristics and future development of students, give guidance to students in areas such as specialty study, academic research and innovative practice.
    - Responsibilities of tutors include: ideological and moral education of students; career development planning (pursuing a graduate degree; studying abroad; finding a job; starting an undertaking etc.); academic guidance (courses selection; academic record; taking exams with honesty; practice and training; graduation project design; academic research; innovation etc.).

- *Students with learning deficiencies*: Special guidance and help should be offered to students who are weak in learning, innovation and overall competitiveness, and relevant measures should be taken accordingly. To learn how to improve their abilities, those students should get help from teachers especially appointed (tutors are the first consideration; Ph.D. students or Master students can also be considered). To get routine help and reminder in terms of learning ability improvement, those students should be grouped with classmates with outstanding academic record (of same major) on a "one-on-one" basis.
- According to SAR, students who failed in two modules should be arranged a "special" academic tutor, who should supervise and encourage the students' study and performance. Awarding the teacher who managed to sustainably improve the academic results of the said students is foreseen as an incentive for good counselling as well.
- Party and the School jointly co-administer students' cultivation affairs and are required to manage students' cultivation more effectively.

Evidence/Sources: inter alia, "Educating and Training Outstanding Engineers – Rules on Management System Reform of Undergraduate Education", No. 16, 2010; "Rules on Undergraduate Tutorial System in OECE", No. 09, 2013.

Analysis of the peers:

It can be generally stated that sufficient resources are at disposal to guarantee support and counselling for students. In particular, the tutorial system provides for close relationship between students and their academic tutors. The tutor is obliged to thoroughly monitor the student's academic achievements and to take adequate action according to the monitoring results. This system of course, as supportive as it is principally, may also have unwanted effects, in that its all-encompassing approach might hinder students' incentives to take responsibility for any self-contained planning and organizing of his/her study course. Otherwise, the students' comments on that reveal not only an apparently well received system of counselling and advice, but also a remarkably trusting cooperation between students and staff.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 3.4 Support and advice

The peers found the said criterion to be fully met by the counselling concept of the HEI. They particularly emphasized the good student-teacher relations and the open-door pol-

icy which facilitate even ad hoc and informal solutions to problems the students encounter.

B-4 Examinations: system, concept and organisation

Relevant information about the examination methods and the concept of examination:

- Credits are only granted when students pass the assessment of all courses combining to a module.
- The assessment methods of theory courses include closed-book examination, open book (semi-open book) written test, small paper, report, oral test, oral-written test, computer skill, skill operation, etc. The assessment of one course can adopt the form of one or multiple methods. Compulsory modules/courses adopt written examinations as primary assessment method, while examination methods particularly in elective modules/courses show a greater variety. Midterm examination occur in some basic subject modules/courses, but aren't overall obligatory.
- The question assignment has to be in line with the characteristics of course and also needs to inspect the students' understanding and mastering status of the basic theory, knowledge and skills and their skills of analyzing and solving practical problems by using it. The question assignment shall pay attention to standardization and scientific parameters such as the question type, quantity, difficulty level, content coverage, etc.
- The course design and graduation design (paper) generally require the combination of teacher reviewing and oral defense.
- Examination requirements and assessment methods are described in detail in the module/course descriptions.
- Bachelor's graduation works might be conducted in cooperation with and even at the sites of industry companies of the majors' topic field, particularly if students are intend to seek for a job after graduation.

The **organisation of exams** is managed as follows:

- Registering for the examination will be automatically done through participation in the module; the awarding of credits also depends on this.

- The final assessment of compulsory courses is arranged and processed *one week before the end of the semester* by the Academic Affairs Office (17th week). Courses of short term are arranged by the teachers according to the teaching programme and the arrangement of the school, and can adopt diverse forms. The assessments of optional courses are arranged by the teachers and the school and proceed *one week after the course end*.

- The overall exam grades are comprised of two parts: regular-time grades and final-exam grades. Regular-time grades are decided by students' class participation, homework performance, quizzes, and mid-term exam grades etc. The overall performance is graded according to the class attendance, assignments, quiz and classroom interaction, etc. and account for 30% ~ 50%of the general assessment score. The final assessment result account for 50% ~ 70%of the general assessment score. The passing score is 60 points of general assessment score, which is the limitation of receiving corresponding course credits.

- One re-examination for each course as a rule; in case of repeatedly failing to pass the examination, the whole module must be successfully completed again; in case of a critical number of failed exams in one semester, students are recommended repeating the full semester; all examinations have to be passed within 6 years time (12 semester).

- Students who receive zero point have no make-up examination qualification; students who receive 1~59 points of the general assessment score can take the make-up examination with a maximum 60 points of the final score for the record.

- No re-examination for practical courses: Students who fail in practical courses can retake the practical classes or choose to take other classes in the same courses group. However, regulations require some points to be paid attention to, i.e. knowledge connection between the chosen practical course and corresponding theoretical course, or specialty requirements between the chosen practical classes and latter chosen ones, time for the chosen classes, and overall credit requirements of the same course group. If necessary, students are supposed to consult related professional supervisors or the specialty principal.

- Students who cannot take the examination on time due to appropriate reasons can re-take the examination according to the schedule in accordance with the relevant re-taking procedure and after receiving approved application. The score received at the re-taking examination is the same as a normal examination.

Evidence/sources: "The Course Assessment Regulation of Full-time Undergraduate of University of Shanghai for Science and Technology", USST, No. 134, 2013; "Rules for Managing Undergraduates' Practical Teaching Process for University of Shanghai for Science and Technology", USST Teaching Article No. 7, 2011; "Educating and Training Outstanding Engineers – Opinions on Implementation of Undergraduate Program Reform of OECE", USST OECE, No. 14, 2010; teaching materials, samples of exams, graduation works presented for the onsite-inspection.

Analysis of the peers:

In general, the concept of examination at the HEI appears to be oriented at monitoring whether the intended learning outcomes of an individual module have been achieved properly. A comparatively large number of assessments, including, at times, midterm examinations, may be considered typical for an assessment approach that monitors the students' achievements intensively. But it also provides students with a helpful insight in their actual state of knowledge, thus altogether supporting their exam preparation.

Though exams for the most part are, at least in the basic subjects, carried through as written assessments, a greater variety of examination methods seems to prevail in other parts of the mandatory curriculum and, in particular, regarding the elective courses. With this reservation, it can be stated that the type and also the distribution of assessments principally are designed to support the attainment of the intended learning outcomes, possible further improvements in this direction notwithstanding.

All in all, this appraisal has been confirmed through the evidence produced by the HEI as to the onsite-inspection of teaching materials as well as samples of exams and graduation works.

At first glance, the rules for examinations and advancement appear to be rather detailed and restrictive. What is more, the hierarchy of norms and rank of binding authority could hardly be judged from the regulations, provisions, principles and guidelines, which have been submitted by the HEI (state, municipality, and university level). This, of course might be traced to the different legal system, as compared to the European normative tradition, and also to the unavoidable problem of a loss of information by way of translation. However, the audit talks left the impression that both students and lecturers are used to and have a good comprehension of these regulations. Taken together, the regulations apparently allow for an adequate exam preparation. They also prove to be transparent to students as far as grading criteria are concerned. Furthermore, students considered the organization of examinations appropriate and responsive to their needs. In particular, this holds also true for the procedural conditions governing the repetition of exams.

In general, the discussions with students and lecturers confirmed the impression that the organization of exams is supportive regarding the achievement of the study objectives and also in terms of completing studies within the standard period of study.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 4 Examinations: system, concept and organisation

According to the peers, the concept of and organizational provisions for the examinations do comply with the accreditation requirements. As to an ever better alignment of the examination methods with the learning outcomes, they are designed to monitor, the peers suggested revising the assessment strategy in the medium term from this point of view.

B-5 Resources

B-5-1 Staff involved

According to the HEI, the teaching staff is composed of 15 full professors, 16 associate professors, eight lecturers and technical staff.

The OECE's relevant research covers a string of academic fields including theoretical optics, opto-electronical technology, optical detection, optical instruments, optical fiber communication technology, biomedical optics, visual optics, printing optical engineering etc. The central laboratory of Optical Engineering is also called Shanghai Optical Instrumental Institute, which has assumed a series of research projects including National Science Funding of China (NSFC) projects, etc.

The SAR lists the following important research & development activities relevant to the degree programme and attributed to individual teaching staff:

- "Research on Micro-Optical-Electro-Mechanical System of visual and artificial device" belonging to the National Basic Research Programme of China "Basic theories and key scientific problems of visual restoration".
- As a national high-tech project (863): "Study of ferroelectric liquid-crystal shutter".
- As a major project "Study of the homemade and key elements of super-small aero craft (i.e., photography systems with long focal length)" from Shanghai Committee of Science and Technology.

- A Long-term cooperative agreement with some internationally competing companies and enterprises such as American OmniVision Co., which is the inventor of CMOS image sensor and the biggest developer and producer in the world. The two sides have joint research projects including “Development of optical lens based on the PDLC materials” and “Study of extending the focal depth of optical systems”.

Evidence/sources: SAR

Analysis of the peers:

Generally, competence, composition and range of staff resources are suited to conduct the Optoelectronic Engineering-programme. The OECE’s and teaching staff’s fields of expertise and research activities are supportive and correspond to the structure and content of the said study programme. Also, the OECE proves keen to consolidate its human resources and to broaden its scientific basis by intensifying its cooperation with companies and other HEIs or research oriented institutions.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 5.1 Staff involved

The peers considered the evidence provided with regard to the said criterion as sufficient.

B-5-2 Staff development

The institution reported on the following measures to subject-related and didactical further training for staff:

- Diverse incentive measures for outstanding achievements in teaching (including awards, advancement and promotion);
- Recruitment and appointment of professors not according to fixed qualifications; newly appointed professors need to qualify for higher positions and to acquire higher qualifications through the teaching/research record, e.g. the promotion to full professorship requires at least some teaching experiences abroad;
- Establishing and carrying through a teaching quality supervising system on a regular basis as a measure to ensure and improve the quality of teaching;
- As a rule, objectives for the individual further development, either in the disciplinary or the didactical field, are agreed upon between Heads of OECE, or the Optoelectronic Engineering Department respectively, and the teachers/lecturers;

- Development and implementation of courses regarding the further development of the teachers.

Evidence/Sources: SAR; audit discussions; “Announcement about Implementing Class-visiting System of School Leaders and Experts”, USST, No. 10, 2013; “Incentive Measures of Educating and Training Outstanding Engineers and Enhancing Quality of Undergraduate Education”, USST OECE, No. 12, 2011.

Analysis of the peers:

In the SAR and also in the audit discussions, the HEI proves that opportunities for further development of subject-relevant knowledge and teaching skills of the teaching staff are available. Moreover, the measures taken to implement a system of continual supervision of teaching staff in order to improve the quality of teaching amounts to a human resources strategy which might well contribute to its primary objective. But as is the case with the tutorial system, the envisioned supervising system might have negative side effects. If overstretched, it might result in blocking even good and ambitious teachers and thus ending up with the very opposite of what OECE wants to achieve.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 5.2 Staff development

The peers found the opportunities for further developing the subject-relevant and/or didactical skills and competences to be fitting the related accreditation requirements. Yet they suggested to carefully implementing the planned supervising system for teaching and teaching staff so as to really extract the intended results.

B-5-3 Institutional environment, financial and physical resources

According to SAR, USST consists of 15 schools, 30 research institutes, 12 research centers and three academies at six locations in the Jungong Road, Fuxing Road, Yingkou Road, the Shuifeng Road, and Nanhui District together. At the USST 56 undergraduate degree programmes and three posts -doctoral programmes are offered. Furthermore, there are 30 PhD- and 59 master's programmes (including 11 programmes in the School of Optical-Electrical and Computer Engineering (OECE)). Currently, about 20,000 students are enrolled, with approximately 4,000 master students and 300 doctoral students.

OECE in USST currently has more than 4000 undergraduate students, nearly 1000 master students and almost 100 doctoral candidates. At present, it has about 500 undergraduate students or four grades with 125 students each. OECE has more than 250 faculty members, including one academician of the Chinese Academy of Sciences, 22 supervisors of Ph.D. candidates, 50 full professors and 70 associated professors.

OECE consists of the Department of Optoelectronic Engineering, Department of Electrical Engineering, Department of Control Engineering, Department of Communication Engineering, Department of Computer Engineering and the Optical Electrical Experimental Demonstration Centre for undergraduate students. Reportedly, the discipline "Optical Engineering" is recognized as the national key discipline (cultivated stage), and the institute of modern optics system is the key laboratory of Shanghai Science and Technology Committee. With respect to this, some national and key organizations are located in OECE like the National Quality Supervision and Inspection Centre of Optical Instruments, the National Engineering Research Centre of Industrial Processing and Automatic Processing, the Shanghai Key Laboratory of Modern Optical Systems, and the R&D Centre of Optical Instruments.

OECE covers a broad spectrum of academic disciplines such as Optical Engineering, Instrument Science and Technology, Control Science and Engineering, Electrical Engineering, Information and Communication Engineering, Computer Science and Technology, Electronic Science and Software Its relevant research encompasses academic fields like theory optics, opto-electrical technology, optical detection, optical instruments, optical fibre communication technology, biomedical optics, visual optics. In general, the main research topics are closely related to the laboratories of OECE.

The financial and physical infrastructure is described in detail in the SAR. This also holds true for the lab equipment in particular.

According to the SAR, OECE, and particularly the Optoelectronic department, has concluded cooperation agreements with:

- More than 10 international Academic partnerships with universities in Germany, the USA, Japan, Switzerland, Russia, Australia, Ireland and Hongkong; in this context: stable long-term cooperation with Coburg University of Applied Sciences, for example in offering a joint Master's degree programme in Measurement Technology and Instruments;
- Wide cooperation and close ties also with universities and institutions in China, e.g. Chinese Academy of Sciences, Tsinghua University, Fudan University, Shanghai Jiatong University, or Tianjin University.

- Long-term cooperation with some famous companies in the industry like the SHANGHAI JINGKE Group (precision and scientific instrument), Shanghai Gaojing Company, etc.

Evidence/Sources: SAR; audit discussions.

Analysis of the peers:

In addition to the indications on human resources, the SAR delivers information on the infrastructure and financial budgeting in more detail. Moreover, the peers visited a variety of labs and the library during the on-site visit.

The onsite-inspection of labs led to the conclusion that OECE has overall adequate lab equipment at its disposal (student lab equipment, in particular). Otherwise, when confronted with the black silicon laboratory, the peers found its operating provisions and procedures not in accordance with international standards. Since working in this lab includes dealing with potentially toxic materials, experiments could always be dangerous. The implementation of and compliance with safety procedures are therefore particularly important. There must not be any deficits in this area, of course; any such deficiency needs to be corrected at an instant. On request, representatives of the HEI assured that safety provisions and procedures have been put in place and are duly followed. According to this, experts for safety in the labs are in charge.

Furthermore, not all of the lab equipment can be considered representing state-of-the-art technology, which would be particularly important with regard to the OECE's decided interest in strengthening its research basis and, by the same token, its study programmes. In this respect, OECE avowedly regards the continuing further development of its laboratory equipment as one of its priority aims. The latter has been aptly demonstrated through indicating a planned renewal of central research facilities.

The already existing cooperation agreements with companies, research institutions and other universities convincingly stress the HEI's will to competitiveness and internationalization. Requiring international experience (or even graduation abroad) from newly hired teaching staff as well as promoting large-scale student exchange further underscores this will. However, as has been argued in chapter B-3-1, the English language skills of students and teaching staff to achieve this goal leave room for improvement.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 5.3 Institutional environment, financial and physical resources

From the perspective of the peers, the information gathered overall contributes to the impression that the available resources facilitate the achievement of the study objectives. However, as has been detailed above, the peers critically addressed some aspects regarding the institutional arrangements and resources respectively. That way, they considered it indispensible, that OECE comprehensibly proves the operation of the black silicon lab complying with international safety standards. In addition to this, the peers found it commendable to implement the planned renewal of the central research facility and also the students' access to the correspondent labs, due to reasons detailed above.

B-6 Quality Management: further development of degree programmes

According to the SAR, the main instruments of quality assurance are the evaluation of students' performance with regard to the results of the course assessment and an evaluation of teaching as well, both carried through on a regular basis and referring to a string of related regulations and instructions.

The evaluation of teaching is done by the lecture management department. The teachers take surveys of students with standardized questionnaires at the end of each semester in their classes. The results are collected by the Chairman of Examiners, transmitted to the Dean of the Faculty and the University, and then disseminated to the individual teaching staff. Students do have access to the results of the evaluation procedure; but any direct feedback loop between students and individual teaching staff isn't implemented thus far, occurring more easily on the basis of their informal cooperation.

Reportedly, an alumni database and an alumni network have been built to gather feedback from the graduates after they commenced their profession. Discussions and periodical gatherings are said to be held when the University celebrates her anniversaries in order to establish a platform for continuous contacts with graduates and thus to further improve the curriculum.

With the development of technology and the demands from the job market rising, a permanent readjustment and development of the degree programme is, as the HEI argues, guaranteed through an institutional framework with a major quality monitoring and measurement department at its base.

All of the said quality assurance measures are covered, as indicated, by a multitude of regulations, provisions and guidelines, irrespective of whether they unfold legally binding force or any other kind of normative power.

As to statistical data on students/graduates performance in the Bachelor's degree programme Optoelectronic Engineering, the HEI submitted the following:

- Number of students and graduation rates, study years 2007 to 2012;
- Statistical data on the professional whereabouts of graduates, study years 2007 to 2012;
- Rates of graduates completing within the standard period of study, study years 2008 to 2011.

Evidence/Sources: SAR; audit discussions; additional information and documents referred to as Main Quality Assurance Regulations of USST.

Analysis of the peers:

The HEI and the OECE on its part have already put in place or plan to implement quality assurance measures and instruments primarily aiming at improving the teaching quality of the study programmes. A multitude of documents of presumably varying normative character (see above chapter B-4 and below chapter 7.1) densely regulate the terms and conditions of teaching and learning. Nearly every aspect of the activities of students and the teaching staff (including "moral" ones) are addressed in one or the other body of rules and regulations. This may be considered as a fundamental contribution to quality assurance since rules consolidate expectations on the students' side as well as on the teaching staffs', and thus consolidate the teaching/learning system both actors are acting in. But an overarching network of regulations may also have unintended side effects, as has been repeatedly pointed out in this report, irritating initiative on either side instead of encouraging it, for instance.

It may also to some extent be traced to this specific kind of normative network that one of the central instruments of quality assurance, the evaluation of the teaching by students, is obviously done without any direct feedback loop between students and teaching staff. Students are, it appears, in the first instance seen as object (to a lesser extent as subject) of quality assurance measures. It might be useful considering further steps in developing the quality assurance concept along this line, in order to correct imbalances which the already existing concept of quality assurance inherently bears.

Otherwise, the manifold regulations and normative guidelines confirm an undoubted, even relentless awareness of the role and relevant aspects of quality assurance with respect to achieving the self-imposed objectives. And they prove evidence of the related efforts and achievements of the HEI. The available statistical data, although only tentatively, suggest on overall remarkable success of the OECE in achieving the study goal of graduating students in the Optoelectronic Engineering-Bachelor's programme in the standard period of time.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 6.1 Quality assurance and further development
Criterion 6.2 Instruments, methods & data

The peers considered the evidence of quality assurance deriving from the measures and instruments already implemented or foreseen to this end meeting the correspondent accreditation requirements. For reasons further detailed above they, however, deemed it commendable to further develop the concept of quality assurance with respect to immediate feedback loops between the students and the teaching staff and, overall, a more proactive participation of students in quality assurance processes. Thus, any shortcomings in the programme could be recognised and effectively addressed at an early stage.

B-7 Documentation and transparency

B-7-1 Relevant regulations

As main regulations have been provided for the assessment of peers:

- "The course Assessment Regulation of Full-time Undergraduate of University of Shanghai for Science and Technology", USST, No. 134, 2013 (*put into force*)
- "Management Regulations of Full-time Students' Study Status under Credit System for University of Shanghai for Science and Technology, USST, No. 102, 2009 (*put into force*)
- "Management Regulations of Course Grades and Credit Authentication for Undergraduates of USST Studying in Other Universities", Academic Affairs Office, April 2012 (*put into force*)

- "Rules for Managing Undergraduates' Practical Course Teaching Process for University of Shanghai for Science and Technology", USST Teaching Article, No. 7, 2011 (*put into force*)
- "Management Regulations for USST Full-time Undergraduates' Graduation Design/Thesis", USST Teaching Document, Art. No. 29, 2007 (*put into force*)
- "Measure to Evaluate Undergraduate Classroom Teaching in USST", USST Teaching Documents, No. 16, 2010
- "Work Specification for USST Undergraduate Teaching", USST Teaching Documents, No. 20, 2010
- "Notice Issued by General Office of Ministry of Education on 2013 National Institutions of Higher Learning Admission Work", Ministry of Education, Education Department, No. 6, 2013
- "Notice Issued by Shanghai Municipal Education Commission on 2013 Shanghai Institutions of Higher Learning Admission Work", Education Commission (Shanghai), No. 13, 2013
- "Notice Issued by Shanghai Municipal Education Commission and Shanghai Municipal Development and Reform Commission on 2013 Shanghai Institutions of Higher Learning Admission Plan", Education Commission (Shanghai), No. 140, 2013.

Relevant instructions, guidelines, principles, opinions and announcements, partly dealing with identical aspects, have also been explicitly referred to as "evidence/sources" in the chapters of this report.

Analysis of the peers:

The uncertainties of the hierarchy of norms and the binding authority of some of the orders notwithstanding (see above chapter B-4), the regulations, provisions, guidelines concerning the admission and examination procedures and criteria clearly encompass all key stipulations for admissions, the operation of the programme and graduation. As has been confirmed by the students, the most relevant regulations are available on the websites of the HEI. Additionally, information brochures inform about the study conditions and the study programmes of the OECE.

As also has been observed in a previous chapter of this report (B-2-2), the OECE hasn't proved so far that the study objectives and learning outcomes for the Optoelectronic Engineering-programme have been made accessible to students and the teaching staff, either in a legally binding document or by any other means that allows referring to it (for instance in the course of some quality assurance procedures).

Assessment of the peers:

For the award of the ASIIN seal

Criterion 7.1 Relevant regulations

The peers considered the requirements of the above mentioned criterion as largely met by the evidence submitted by the HEI. However, as done earlier in this report, they insisted on requiring the HEI to authoritatively publish and made accessible the study objectives and intended learning outcomes to students and teaching staff in such manner that they may refer to it (for instance, in the course of the internal quality assurance processes).

B-7-2 Diploma Supplement

A sample of the Diploma Supplement in English language has been annexed to the self-assessment report. It provides information about the study aims and learning objectives, the nature, level, context, content and status of the studies, and the overall success of the graduate.

The diploma supplement also consists of statistical data in addition to the national grade, allowing for a comparative evaluation of the final grade of graduates. The Transcript of Records, in turn, informs about the student's achievements in the individual modules, and thus about the composition of the final grade.

Evidence/Sources: Sample of Diploma Supplement

Analysis of the peers:

As could be seen from the evidence submitted, the sample of the Diploma Supplement contains information about the study objectives, the structure, level, content and status of the studies and the overall success of graduates.

Since all marks, including the final mark, in the accompanying Transcript of Records refer to the GPA grading system, some information about this system is needed to assess the marks meaningful and comparative. This information is still missing in the Diploma Supplement and the Transcript of Records.

Assessment of the peers:

For the award of the ASIIN seal

Criterion 7.2 Diploma Supplement and qualification certificate

The peers deemed the Diploma Supplement and Transcript of Records broadly matching the accreditation requirements. They insisted, however, upon integrating relevant information about the GPA grading system in either document.

C Additional Information

Not necessary.

[Rules for admission (state and university level) as well as relevant exam regulations for the study programme have been submitted subsequent to the onsite-visit and taken into account in the report.]

D Comment of the HEI (15.02.2014)

Preliminary Overview

After the study of the accreditation report written by peers, the following overviews of the comments and the improvements in the subject and intern quality insurance are concluded:

- Safety measures in Black Silicon Laboratory will be taken according to the international standards.
- Module composition and descriptions of “Computer Science” and “Electric Circuits” will be revised.
- All module descriptions will be improved in order to become clear, which knowledge the students after the passed exams should master and which competences they really command (B-2-3). The achieved competences of each module will be more stressed.
- The module descriptions should comprise the time proportions for lecture, exercise, lab, self-study etc.
- The modules which be run in three semesters should be subdivided in smaller ones.
- The measures for competence training of experimental lab assignments will be tightened, in order to improve the lab operation. The lab conduct will be more planned and executed rather than be arranged due to the instructed sequences (B-2-4, B-2-6).
- USST will intensify feedback system of information exchange between the students and professors. The professors must orient themselves towards the learning objectives/outcomes of each module. The module handbook will be published in English and Chinese in an authoritative manner (B-2-2). The active role of the students will be strengthened.
- The English lectures should be improved methodically, through more reform in training communication skills such as speaking, listening and writing etc.
- The part of lab equipment should be modernized.

- The calculation of GPA in Diploma Supplement will be declared much more clearly, with formula and example.

The detailed comments about the particular clauses are specified as followed.

D-1 Formal specifications

No comment.

D-2 Degree programme: content concept of implementation

D-2-1 Objectives of the degree

D-2-2 Learning outcomes of the programme

Comments on Objectives of the degree and on Learning outcomes of the programme are as follows:

The University publicizes information such as objectives of programs and outcomes of learning process through three channels: A) Each student is given a copy of USST Undergraduate Programs and a copy of USST Rules and Regulations for Students upon registration. These two copies of materials contain detailed information such as program objectives, requirements for graduation, curriculum module and curriculum plan for the next 8 academic terms, and rules and regulations for students. B) Above-mentioned information can be downloaded from the official website of the University so that students can get access to the information at any time and any place. C) To help students better understand program objectives and requirements for graduation, person in charge of the program and teachers concerned will, through one-on-one communication, give guidance on the relevant matters within the first week of student's registration. In addition, supervisors will give similar guidance during each academic term.

According to the peers, some students do not have an adequate understanding of the above-mentioned information. The lack of proper understanding may due to the following reasons: Influenced by Chinese educational traditions, most students' priority is completion of academic tasks and getting credits which may lead to inadequate understand-

ing of the relationship between program and curriculum and relationship between contents of courses and development of abilities. To address this problem, person in charge of the program has used various methods to give guidance. After years' of efforts, more and more students start to pay attention to these matters although some still remain indifferent.

Student's possibility of choosing their favourite program is somewhat restricted by China's current educational system. Their parents and high school teachers may also interfere in this matter. As a result, students may find themselves in a passive position when choosing their academic programs, which may have a negative impact on their growth. This problem is just on the reform agenda of educational circle of China.

D-2-3 Learning outcomes of the modules/module objectives

The curriculum and its contents are the most important factors in achieving training and learning objectives of OECE. Our current curriculum and its contents have been developed on the basis of our research on similar programs offered by foreign institutions, our solicitation of comments and suggestions from industry insiders and our long-time teaching experience. Our efforts and achievement in this regard have also been recognized by the peers.

We, to some degree, agree with the peers on their opinions of our module arrangement and its description. In fact, to achieve curriculum objectives has always been our principle during teaching process; however, due to our misinterpretation of the word "module", we refer to it as "cluster of courses" in our English presentation instead of "individual course". This misrepresentation can explain why our description is about curriculum module instead of each course.

We do have a complete Chinese curriculum description. Each course syllabus contains information such as course content, teaching objectives, teaching method, hours distribution, course contents & requirements, assessment methods and references. Language used in teaching process is also clarified, i.e. whether it's Chinese, English or bilingual. Therefore, we'll provide the description of each course just for reference and confirmation purposes.

We have also given consideration to issues such as relationship and continuity between courses, distribution of knowledge points and workload. Explanation of these issues is given in course syllabuses. Our current arrangement of workload is about average in China and therefore is reasonable to some extent.

So far, our self-evaluation report, test paper and graduation theses provided for accreditation are all authentic. Our English website is set up for ASIIN accreditation so as to facilitate our communication with our German counterparts.

D-2-4 Job market perspectives and relevance

Practice has been one of our teaching priorities. Time allotted for practice is prescribed in our curriculum. Hours for practice shall account for no less than 25% of all training hours. Our students can participate in practice through five channels: a) course experiment; b) independent experiment course; c) course design; d) enterprise internship; e) gradation project. Experiment course emphasizes not only the student's understanding and thorough learning of basic theories, but also the competences to solve problems. Course design, enterprise internship and graduation project focus more on the development of student's design competence as well as comprehensive competences.

In addition, the School has also set up undergraduates' innovation design programs with each project offering RMB 10,000 (about 1,200 Euros) in aid. All the students have the opportunity to apply for these programs independently or in groups. During each summer vacation, students all have the chance to participate in science & technology competition with aid from the School and lots of students have achieved excellent results in these competitions. This is a perfect example of our efforts in developing student's innovation abilities. All the above-mentioned teaching activities have created favourable conditions for the development of student's practical abilities.

Still, we have found the weak points of students in practical activities since Chinese students tend to do better in exams than in practice. Fortunately, student's practice has become one of the priorities of more and more Chinese universities. Students and teachers also start to learn the importance of practical activity. As one of the requirements of the University, young teachers can be awarded a higher academic title only with Engineering practice or Enterprise background, i.e. the importance of practical teaching is reflected from the building of a team of outstanding teachers.

D-2-5 Admission and entry requirements

Compared with many European and North American universities, Chinese universities are unique with their admission rules. China is still a developing country and has limited educational resources, therefore there are a huge number of Chinese young people dream to become university students. To meet the need, Chinese government sets up a national examination mechanism to select students who have achieved excellent results in the

exam. The majority of students work very hard after entering university since they know how precious the opportunity is.

Education at Chinese high school now is divided into two fields, i.e. liberal arts and science. According to state rules, OECE can only admit science majors so our students all have firm grounding in natural science which lays a solid foundation for their future study in science. In addition, since USST is located in Shanghai which, as a metropolitan city, attracts a large number of outstanding applicants. Each student of our School is assigned a teacher as the tutor who will offer guidance when the student has difficulties in study. All these are factors which contribute to the high graduation rate at Chinese universities and OECE is no exception.

D-2-6 Curriculum/content

We've already realized the importance of developing student's competences. As we mentioned in F2-3, we have taken many effective measures to improve student's competences and will make more efforts in this regard in the future.

D-3 Degree programme: structure, methods and implementation

D-3-1 Structure and modularity

As the peers suggested, our curriculum and its contents are reasonable. We, however, have different views on curriculum module with the peers. This difference in opinions is due to two reasons: a) Generally speaking, our understanding of the word "module" is the same with that of the peers; however, difference still exists. We've already explained it in D-2-3 b) The cross-crediting mode in Asian universities is different from that of European universities which is guided by Bologna process. Cross-crediting mode in Asian universities is mainly about course credits recognition. Module credits recognition is a less popular practice.

In China, "module" usually refers to course group whose meaning is similar to that stated in ASIIN accreditation. In Chinese educational system, "course group" refers to the grouping of courses whose contents are logically interconnected. One typical example is the computer course module of OECE. This module is the result of grouping of courses whose contents are mainly about computer. The benefits of this specific design are twofold:

A) It may bring convenience and efficiency to course management. Since course group is composed of courses which are closely linked, the instructors can be chosen from relevant teaching & research department. For example, computer course module of OECE is composed of basic courses and advanced programming courses such as Basic Computer, C Program and C++. Instructors of these courses all come from Computer Department of OECE which brings convenience to course arrangement and management. Instructors of circuit module mainly come from Electric & Electronic Department. These instructors also teach electric & electronic courses offered to engineering majors in our University.

B) It may help students more easily understand curriculum and consequently more readily accept this kind of design. For example, computer course group can be more easily accepted by students since as an OECE student, computer is a specialty and tool which must be mastered.

As for credit transfer and cross-crediting, popular practice in China is course credits recognition. For example, if a former USST student transfers to Fudan University or Tongji University to study in the same field, his or her previous course credits, according to course title, course contents and teaching hours, can be transferred to these universities or other universities. If a student pursues further study at European or North American universities, his or her credits obtained at USST will often be transferred and recognized in the form of course module.

OECE attaches great importance to the development of student's English proficiency. The School designates a large quantity of credits to English courses and creates foreign language teaching laboratory. Apart from these measures, the School also takes other actions including: encourage students to take national English proficiency test; encourage students to go abroad for further study, internship or academic visits; set up courses which are given in English such as nanotechnology and integrated circuit manufacturing technology. These courses are the' demonstration English courses' awarded by Shanghai Education Committee.

Despite the importance attached to student's English proficiency by Chinese educational circle, Chinese people, compared with the Westerners, are usually weak in listening/speaking activities and cross-cultural communication. This may be caused by the huge differences between Chinese and English. Most Chinese students, however, are relatively strong in reading and writing activities.

The government and the University create opportunities for teachers to go to countries with advanced higher education as a visiting scholar. These measures not only facilitate joint scientific research with our foreign counterpart but also help our teachers improve their English communication ability.

D-3-2 Workload and credit points

Student's workload has always been one of our concerns. Either too much or too less workload is harmful. We examine student's workload through two channels: A) Course exams. Course instructor will analyze test paper after each exam so as to find out which part is too difficult or too easy, or the workload connected is too much or too less. B) Randomly select students for informal discussion each term. Listen to student's report on their study and campus life and solicit student's comments and suggestions concerning specific courses and the instructors. These measures help us find out whether student's workload is reasonable. Tutors also join in the same efforts through observation.

After sorting out the collected information, we draw meaningful conclusions which may be provided for teachers as reference when we revise curriculum and course syllabus each year, and afterwards we redesign our teaching. Through these efforts, our curriculum has constantly been revised and improved.

D-3-3 Educational methods

No comment.

D-3-4 Support and advice

As for support for students, our standard is adequacy rather than excess. Excessive support may bring negative impact on students. As the Chinese old saying goes: "Give a man a fish and you feed him for a day. Teach him how to fish and you feed him for a lifetime." This is a principle we adhere to when we provide support for students.

D-4 Examination: System, concept and organization

We strictly follow regulations of the state, local government and the University when we organize exams at the end of each term. To better achieve learning objectives, we organize mid-term exams for some courses and quizzes for other courses. The specific form and frequency of exams are determined by professors in light of the nature and characteristics of each course.

D-5 Resources

D-5-1 Staff involved

No comment.

D-5-2 Staff development

Over a decade ago, the management of OECE had already realized the fact that too strict teacher appraisal may bring negative impact on the growth of teachers. Our principle is that each teacher can give a full play to their strengths. However, since Chinese higher education institutions now mainly engage in pursuit of achievements and fierce competition, it's necessary to design a system which matches actual condition.

D-5-3 Institutional environment, financial and physical resources

Personal and property security has always been one of the priorities of the University. The management of black silicon laboratory conforms to Rules of the People's Republic of China on Fire Safety and Flammable Chemicals (promulgated by Ministry of State Security in 1994). Two professors are in charge of the safety responsibility issues of the laboratory. As for high power laser system, all operation personnel have received training before conducting independent operation work. Signs are posted outside the laboratory and on the wall at the entrance. To prevent laser leakage, the door of laser laboratory has always been shut. Whenever the door and windows of the laboratory are opened, equipment such as laser is always safely switched off. The storage and application of chemicals are done according to state standards. Detailed and complete records of delivery from/to warehouse as well as information about usage are kept. We understand that the peers raise some doubts about the safety of the black silicon laboratory. Their concern may originate from the differences between safety standards of Chinese laboratory and those of European laboratory, the latter possibly being higher. Therefore, we'll start to look into European standards so as to improve the safety of our laboratory and our work will be done in line with international advanced standards.

Although China is still a developing country with limited financial resources, the country has continuously increased its annual investment in education. The laboratory of OECE has received financial aid from the government for years and has brought a large stock of equipment and instruments in recent years. However, our experiment conditions are still

inadequate and we'll try to improve the conditions over the next few years and keep them in an advanced and sound state.

Our research laboratory is accessible to all students from the relevant specialty. All the students can work in the laboratory, especially when working on graduation project during the 8th term. For students whose graduation project is completed at enterprises, they may have less chance to work in research laboratory. Those who have received aid for their innovation project or have been involved in the research program led by their supervisors, they may have more chance to work in research laboratory.

D-6 Quality management: further development of degree programme

D-6-1 Quality assurance and further development

D-6-2 Instruments methods & data

Comments on D-6-1 Quality assurance and further development and on Instruments methods & data are as follows:

The University fully understands that comprehensive and strict management regulations are beneficial for the normal operation of our teaching activity. However, we also understand that too many and too strict regulations may bring negative impact. The University, therefore, establishes an ever-improving mechanism. A special committee will hold discussion about the existing rules and regulations each year and make adjustment according to actual situation of teaching activities.

Over 30 years ago, each field of Chinese society experienced a lack of laws and regulations which had caused many problems for the normal operation of Chinese society. With the reform and opening-up, more efforts have been put into construction of legal system in various fields including higher education. If today we examine construction of legal system in China, we may say all the work done in this regard is meaningful. However, we have to admit that excessive construction does exist. USST has therefore established an ever-improving mechanism to avoid the negative impact brought about by too many rules and regulations.

As for teaching quality system, as we explained in F3.2, the University solicits comments and suggestions from students through various channels such as mid-term teaching inspection, inspector's report and student's evaluation of teachers. After comprehensive

evaluation, the University will adopt those constructive comments and suggestion in future teaching activity and make timely adjustment of relevant process and regulations.

The University attaches great importance to the active role played by students in teaching quality monitoring. Student's evaluation of teaching quality is a major component of our teaching quality evaluation system. Each student has the opportunity to make an overall evaluation of teaching quality and course quality before the end of each term. After collecting student's evaluation and suggestions, the Office of Teaching Affairs will inform relevant teachers and management personnel of the information so that those concerned may make timely improvement.

D-7 Documentation and transparency

D-7-1 Relevant regulations

Teaching operation rules of OECE are accessible to all students and teachers. The School encourages students and teachers to get acquainted with relevant process and rules through issuing paper curriculum, rules and regulations for students and teaching management documents for students. The electronic version of these process and rules are available at the official website of the University and the School.

D-7-2 Diploma Supplement and qualification certification

After deliberation of Degree Examination Committee, whether a student is qualified for graduation or shall be awarded a degree will be determined. The decision is based on the following documents: training objectives; graduation requirements; curriculum; score reports; enterprise internship report and graduation project documents. All these documents are transferred to University file room for preservation in accordance with the Archives Law of China. Upon student's graduation, the University will issue the diploma and degree certificate to the student and transfer student's archives to the units and institutions which employ the student. If the student continues to pursue a Master's degree, his or her archives will be transferred to the relevant university. If the student pursues a Master's degree at a foreign university, his or her archives will be transferred to a special department for preservation.

In addition, as a component of student's diploma, more information is added to diploma supplement in light of international standards. Through this measure, student's diploma

will acquire internationally recognized degree equivalence and finally help student achieve international mobility in their future academic and professional life.

E Final Assessment of the peers (27.02.2014)

The peers find the **comments** provided by the institution to be constructive and instructive at once. They are especially pleased to hear that the School of Optical-Electrical and Computer Engineering (OECE) plans to implement improvements with regard to specific aspects of the modularization (see above chapter B-3-1), the module descriptions (see above chapter B-2-3), the Black Silicon Laboratory (see above chapter B-5-3), the information on the GPA grading system generally applied in the Diploma Supplement (see above chapter B-7-2), and other topics as well.

Some of the thoroughly elaborated comments are considered particularly helpful and instructive in that they not only contribute to a better understanding of the Chinese educational system in general and its cultural setting, but also of how the USST is constantly working to use its operational and regulatory scope for the benefit of the further development of its study programmes.

Having said this and taking into account the additional information and the comments given by University the peers summarize their analysis and **final assessment** as follows:

ASIIN criteria 2.2, 7.1 (study objectives and learning outcomes)

The USST / OECE has plausibly argued that all interested parties, and students and teaching staff in particular, do have already access to the study objectives and learning outcomes which are clearly stated in the SAR. Obviously, there are several channels (the official website of the USST being only one of them) safeguarding the dissemination of the study objectives and learning outcomes of the Optoelectronic Engineering-Bachelor's programme. It seems no longer necessary requesting the USST / OECE to prove just this. The peers therefore decide to waive a requirement they initially deemed inevitable in order to assure the accessibility. The detailed statement on the close relation of programme content, curricular structure and learning outcomes also strikingly illustrates that the USST / OECE is well aware of its importance for the study success on the whole.

ASIIN criteria 2.3, 3.1 (module descriptions, modularization)

It is recognizable and fully understandable that the concept of "modules" in a certain sense does carry a different meaning in China as compared to the respective European

technical language. But, on the other side, the difference is only gradual, not absolute in kind. As the USST / OECE convincingly states, a "module" in its proper Chinese understanding means a group of courses "whose contents are logically interconnected". The Computer Science-module is referred to as typically representing this meaning of the term. Now, the European understanding of the concept of "modules" not only requires to assemble courses that are mutually interconnected or thematically related, but also to *integrate* them in such manner that they form a package of teaching and learning units *in itself*. "Modules" in this sense are thought to be the main building blocks of the curriculum (instead of the "courses" they consist of), but certainly not at the expense of the benefits the USST / OECE ascribes to its Chinese version (efficiency of course management, transparency of curriculum design). Consequently, in both cases the concept of "modules" alludes to thematically linked courses. But while the Chinese version in the first place is about grouping those courses, the European notion refers to combining and integrating courses and thus forming independent learning and teaching units.

However, with only a few exceptions (mainly the modules "Computer Science" and "Electric Circuits") the peers have considered the modules forming the curriculum of the Optoelectronic Engineering- programme to be adequate, irrespective of whether the Chinese or the European concept is applied. But with regard to the stricter sense of the Bologna concept of modules underlying the ASIIN criteria for the modularization, they confirm their critical assessment of the modules "Computer Science" and "Electric Circuits" as well as of those modules taking more than two semesters or taught in non-consecutive semesters. From their point of view, the USST / OECE will have to take appropriate measures to adopt these modules in the said manner (see below requirement 2, recommendation 2). As to this, the constructive statement of USST / OECE suggests that it is moving in the right direction.

For just the same reason the peers wouldn't consider it adequate and sufficient, if the *course descriptions* already available in Chinese language and allegedly in large part containing much of the information missed in the *module* descriptions (ratio of lecture/exercises/labs, teaching language, module-related courses, for instance) are provided in English language. As they have underscored in chapter B-2-3, these data need to be accessible in the *module descriptions*, notwithstanding their simultaneous accessibility in the *course descriptions*.

ASIIN criteria 5.1 (resources, Black silicon lab)

It is taken note of the declaration that the black silicon laboratory "conforms to Rules of the Peoples' Republic of China on Fire Safety and Flammable Chemicals". It is also posi-

tively regarded that the USST / OECE in its statement generally emphasized the importance of and measures in regard to personal and property safety. However, at least during their onsite inspection peers have found the operating conditions in the black silicon laboratory not being in accordance with international safety standards. The argument that the European or Western standards might be higher than the Chinese equivalent cannot resolve all doubt that the safety procedures in place effectively guarantee the safety of persons working in the laboratory. This applies a fortiori in respect to the USST / OECE commitment that "[o]ur research laboratory is accessible to all students from the relevant specialty". For that reason, peers insist that USST / OECE must procure clear evidence that the safety standards in the black silicon laboratory meet international safety requirements (see below requirement 4).

ASIIN criteria 2.4, 2.6 (practical training, competences in engineering practice)

It is without doubt that the USST / OECE has consciously integrated practical training of various types in the curriculum, and that it is well aware of the special importance of competences in engineering practice for both the study achievements and any professional success in the engineering field. But – as the programme coordinators concede – the experimental work done by students in the OECE's laboratories should be and could be less narrowly specified and planned, thus leaving more room for more self-assertive and proactive action of students. The peers therefore propose to address a recommendation to this end to the USST / OECE (see below recommendation 3).

ASIIN criterion 3.1 (English language skills)

The manifold efforts of USST / OECE to develop the students' and lecturers' English proficiency have been acknowledged already in a previous chapter of this report. They are highly appreciated and will in the long run pay back. However, in the audit talks peers have received the impression that there is still room for improvement. They therefore maintain a recommendation in this respect (see below recommendation 4).

ASIIN criterion 6.1, 6.2 (quality assurance)

It is generally appreciable that the USST / OECE is intend on developing an approach to quality assurance that not only relies on an ever increasing normative network.

In this respect, the students' contribution to assuring and developing the quality of the study programme in their role as evaluators is undisputed. Nevertheless, a more active part of students in the quality assurance processes would be desirable. With respect to this, the peers confirm a recommendation foreseen at the time of the onsite visit.

For the award of the ASIIN seal:

With the modification concerning the learning outcomes (ASIIN-criteria 2.2 and 7.1), the peers confirm their assessment and recommended resolution preliminary drafted at the time of the onsite visit.

For the award of the EUR-ACE® Label:

The peers conclude that the intended learning outcomes of the degree programme under review do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committees 02 – Electrical Engineering and Information Technology of ASIIN and 05 – Physical Technologies, Materials and Procedures. Therefore, they do recommend the award of the EUR-ACE® label.

The peers recommend the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific labels[1]	Maximum duration of accreditation
Ba Optoelectronic Engineering	With requirements	EUR-ACE®	30.09.2019

Requirements and recommendations for the different seals:

Requirements	ASIIN
1. The modules "Computer Science" and "Electric Circuits" have to be revised regarding their conceptual design as coherent and consistent teaching and learning units.	3.1
2. The module descriptions have to be updated according to the remarks given	2.3,

[1] Requirements / recommendations and terms of Subject-specific labels do always correspond to the ASIIN-seal.

in the report (learning outcomes, description of non-technical skills/competences ("soft skills"), depiction of content, ratio of lecture/exercises/labs, teaching language, module-related courses, missing module descriptions (general courses, internship, graduation work / Bachelor Thesis)). They also need to be made accessible to both students and teaching staff.	3.1, 3.3
3. It must be comprehensibly proved that operating the black silicon lab complies with international safety standards.	5.3
4. The rules for the recognition of academic activities completed externally need to be adapted in such manner that they more aptly reflect the respective learning achievements and, thereby, also encourage and facilitate the mobility of students.	3.1
5. The diploma supplement (or the transcript of records) needs to include a reference to the GPA grading system in order to transparently inform about the graduates' achievements and final mark.	7.2, 4

Recommendations	**ASIIN**
1. It is recommended to further develop the concept of quality assurance with respect to immediate feedback loops between the students and the teaching staff and, overall, a more proactive participation of students in quality assurance processes. Thus, any shortcomings in the programme could be recognised and effectively addressed at an early stage.	6.1
2. It is recommended that modules with a duration of altogether three semesters or comprised of courses which aren't taught in consecutive semesters should be adapted so as to allow for a more flexible combination of modules as well as to facilitate the transfer of credits.	3.1
3. It is recommended to further enhance the students' competence to design and conduct experimental laboratory work (e.g. with respect to the Bachelor thesis).	2.4, 2.6
4. It is recommended that, with a view to internationalisation, already existing	3.1

efforts to improve English language skills and to offer English-medium courses in the curriculum should be strengthened. In that respect, cooperation with (international) HEIs should be further developed.	
5. It is recommended to more strictly align the examination methods with the intended learning outcomes of the individual modules.	4
6. It is recommended to implement the planned renewal of the central research facility and also the students' access to the correspondent labs. This may contribute to strengthening the research basis and research competences of graduates.	5.3

F Comment of the Technical Committees

F-1 Technical Committee 02 – Electrical Engineering and Information Technology (10.03.2014)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee fully agrees to the assessment of the peers (see above chapter E).

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programme do comply with the engineering specific part of its Subject-Specific Criteria.

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

Degree Programme	ASIIN-seal	Subject-specific labels	Maximum duration of accreditation
Ba Optoelectronic Engineering	With requirements	EUR-ACE®	30.09.2019

F-2 Technical Committee 05 – Physical Technologies, materials and processes (04.03.2014)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee fully agrees to the assessment of the peers (see above chapter E).

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programme do comply with the engineering specific part of its Subject-Specific Criteria.

The Technical Committee 05 – Physical Technologies, Materials and Processes recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific labels	Maximum duration of accreditation
Ba Optoelectronic Engineering	With requirements	EUR-ACE®	30.09.2019

G Decision of the Accreditation Commission (28.03.2014)

The Accreditation Commission for Degree Programmes discusses the procedure. It agrees to the assessment of the peers and the relevant Technical Committees without any modification or addition.

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

The Accreditation Commission fully approves of the assessment of the peers and responsible Technical Committees.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programme do comply with the engineering specific parts of the Subject-Specific Criteria of the Technical Committees 02 and 05.

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

Degree Programme	ASIIN-seal	Subject-specific labels	Maximum duration of accreditation
Ba Optoelectronic Engineering	With requirements	EUR-ACE®	30.09.2019

Requirements

A 1. (ASIIN 3.1) The modules “Computer Science” and “Electric Circuits” have to be revised regarding their conceptual design as coherent and consistent teaching and learning units.

A 2. (ASIIN2.3, 3.1, 3.3) The module descriptions have to be updated according to the remarks given in the report (learning outcomes, description of non-technical skills/competences (“soft skills”), depiction of content, ratio of lecture/exercises/labs, teaching language, module-related courses, missing module descriptions (general courses, internship, graduation work / Bachelor Thesis)). They also need to be made accessible to both students and teaching staff.

A 3. (ASIIN 5.3) It must be comprehensibly proved that operating the black silicon lab complies with international safety standards.

A 4. (ASIIN 3.1) The rules for the recognition of academic activities completed externally need to be adapted in such manner that they more aptly reflect the respective learning achievements and, thereby, also encourage and facilitate the mobility of students.

A 5. (ASIIN 7.2, 4) The diploma supplement (or the transcript of records) needs to include a reference to the GPA grading system in order to transparently inform about the graduates’ achievements and final mark.

Recommendations

E 1. (ASIIN 6.1) It is recommended to further develop the concept of quality assurance with respect to immediate feedback loops between the students and the teaching staff and, overall, a more proactive participation of students in quality assurance processes. Thus, any shortcomings in the programme could be recognised and effectively addressed at an early stage.

E 2. (ASIIN 3.1) It is recommended that modules with a duration of altogether three semesters or comprised of courses which aren't taught in consecutive semesters should be adapted so as to allow for a more flexible combination of modules as well as to facilitate the transfer of credits.

E 3. (ASIIN 2.4, 2.6) It is recommended to further enhance the students' competence to design and conduct experimental laboratory work (e.g. with respect to the Bachelor thesis).

E 4. (ASIIN 3.1) It is recommended that, with a view to internationalisation, already existing efforts to improve English language skills and to offer English-medium courses in the curriculum should be strengthened. In that respect, cooperation with (international) HEIs should be further developed.

E 5. (ASIIN 4) It is recommended to more strictly align the examination methods with the intended learning outcomes of the individual modules.

E 6. (ASIIN 5.3) It is recommended to implement the planned renewal of the central research facility and also the students' access to the correspondent labs. This may contribute to strengthening the research basis and research competences of graduates.