ASIIN Seal & EUR-ACE® Label Accreditation Report

Bachelor's Degree Programme
Industrial and Systems Engineering

Provided by
International University – Viet Nam National University Ho Chi Minh City

Version: 12 July 2024

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Kỹ sư Kỹ thuật Hệ thống Công nghiệp	Bachelor of Engineering in Industrial and Systems Engineering	ASIIN, EUR-ACE® Label	AUN-QA (ASEAN University Network) 10 May 2016 – 09 May 2019	06
Date of the contract: 27.04.2022 **Submission of the final version of the self-assessment report:** 04.08.2023 **Date of the onsite visit:** 04.10.2023 at: VNU HCMC IU				
Expert panel: Prof. Dr. Matthias Werner, Konstanz University of Applied Sciences Dr. Truong Van Thuan, Hanoi University of Science and Technology Dr. Thomas Röhling, Erste Group Bank AG Bui Thi Minh Thuy, student at the Vietnamese-German University				
Representative of the ASIIN headquarter: Sascha Warnke				
Responsible decision-making committee: Accreditation Commission for Degree Programmes				
Criteria used:				

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes.
[2] TC: Technical Committee for the following subject areas: TC 06 - Engineering and Management, Economics.

European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of July 12, 2021 Subject-Specific Criteria of Technical Committee 06 – Engineering and Management, Economics as of September 20, 2019	

B Characteristics of the Degree Programme

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Kỹ sư Kỹ thuật Hệ thống Công nghiệp	Industrial and Systems Engineering (B. Eng.)	a) General minor b) Intelligent industrial systems minor c) Industrial analytics minor	6	Full time	No	8 semesters	152 IU credits (250.1 ECTS)	Annually in autumn semester, since 2009

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

"The curriculum of the ISE program is organized as 4-year program as Freshman Year, Sophomore Year, Junior Year, and Senior Year. The contents of the curriculum consist of four knowledge blocks: general education block, core major block, specialization major block, and internship & thesis block. There is a good balance between the general and specialized knowledge, which allows students to have a strong background in not only the general engineering knowledge but also the specialized ISE knowledge. It also shows a breadth, depth and professionalism, which fits to the difference of individual purpose."

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

C Expert Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, Content & Implementation

Criterion 1.1 Objectives and Learning Outcomes of a Degree Programme (Intended Qualifications Profile)

Evidence:

- Student's handbook
- Programme Specification
- Issuing Regulations on formal undergraduate education applying academic credit system at IU – VNU-HCM
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The International University (IU-VNU) is a member of the Vietnam National University Ho Chi Minh City (VNU-HCMC) and is regarded the first public international university of Vietnam. Since its foundation in 2003 IU-VNU has aimed to reflect internationality throughout its entire environment, be it the teaching staff, the degree programmes or the academic and research infrastructure.

The degree programme under review here is a Bachelor's programme called "Industrial and Systems Engineering", located at the School of Industrial Engineering & Management, founded in 2009. The auditors refer to the requirements of the ASIIN Subject-Specific Competencies 06 – Industrial Engineering and the EUR-ACE criteria for their assessments.

The programme objectives and intended learning outcomes are reflected in the programme specifications and the student's handbook, an official document that lays out all

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

relevant rules and regulations of any cohort. Additionally, the website of the School of Industrial Engineering & Management features the capabilities to be achieved upon graduation, which are as follows:

1) Practicing engineering in the field of production and services, who

(i) Design or redesign industrial system.

(ii) Operate and manage industrial system.

(iii) Improve the existing industrial system.

(iv) Support for wise decision making.

2) Engaging in lifelong learning to maintain and enhance professional skills.

3) Working effectively with people and demonstrating leadership, professional skills, and ethical behavior in the workplace.

4) Fulfilling the needs of the community and industrial sector of Vietnam in solving technical and management problems using industrial and systems engineering principles, tools, and techniques.

The intended learning outcomes are adapted from the ABET criteria for student outcomes of general engineering programmes. After a change in these guidelines in 2020, IU-VNU adapted the intended learning outcomes to the following list:

1 An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2 An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3 An ability to communicate effectively with a range of audience

4 An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5 An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6 An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7 An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

These learning outcomes are comprehensively intertwined with the programme objectives. The School of Industrial Engineering & Management was able to show that the programme objectives and intended learning outcomes were formulated keeping in mind the visions and missions of the entire university as well as the standards for internationally accredited bodies. Furthermore, according to the university, the programme objectives and intended learning outcomes are regularly surveyed and discussed with relevant parties, i.e., industrial partners, senior students, alumni, and faculty staff. These surveys aim to highlight the importance of each intended learning outcome for each of the several parties involved. It shows that each group is represented as follows:

1) ISE department and IU:

- Building a quality program that is internationally recognized

- Bringing about international standard graduates who contribute significantly to the development and industrialization of Vietnam

2) Industry:

- Having industrial engineering workforce, which can be efficiently in charge in various functions of a production or service system

3) Students & Alumni:

- Able to join the ISE workforce upon graduation, competitive, lifelong learning for personal and career development

During the audit, the assessors discussed the formulation of the programme objectives and intended learning outcomes. They found that, generally, both reflect the applicable academic specification and follow the university's Regulations on formal undergraduate education applying academic credit system. They are well integrated into the university's statement of mission, vision, and philosophy. The assessors further concluded that the POs and ILOs are in line with both the general criteria of ASIIN as well as its subject-specific criteria and those set by EUR-ACE®. Hence, the general formulation is marked as positive by the assessors.

Finally, the auditors called into question the involvement of the industry in the regular review. The industrial representatives present during the audit (among them CEOs of close-by industry and employees of the companies the university has partnerships with) gave the

impression that they were hardly involved in formulating or motivate changes to the programme objectives and intended learning outcomes. Rather, the industrial stakeholders reported that they receive changes made by the university which they may comment and give feedback to. The stakeholders wished for more involvement in the process, which would ultimately help to ensure the quality of the programme.

Ultimately, the university has provided a solid list of ILOs and POs that represent the set of knowledge which is necessary for graduates of engineering programmes.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Student‘s handbook
- Exemplary Academic transcripts
- Exemplary degrees
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:
The name of the Bachelor’s degree programme is “Kỹ sư Kỹ thuật Hệ thống Công nghiệp” in Vietnamese and has the English equivalent “Bachelor of Engineering (B.Eng.) in Industrial and Systems Engineering”. The English title of “Industrial and Systems Engineering” is used in all official documents, with the Vietnamese title being added in bilingual documents, e.g. in degree certificates. The language of instruction is English.

According to the programme heads the title itself is already a well-established designation for a degree programme of this specialisation at other universities, which is why this title was chosen. The expert team agree that the title reflects the contents of the curriculum in a sufficient capacity.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report

- Issueing Regulations on formal undergraduate education applying academic credit system at IU – VNU-HCM
- Student exchange website https://cim.IU-VNU.edu.vn/
- Guidelines to review and update curriculum
- Record and regulation of curriculum changing
- Objective-module matrix
- Curriculum overview
- Module descriptions
- Students' handbook
- Discussion during the audit

Preliminary assessment and analysis of the experts:

During the audit at IU-VNU, the university provided the assessors with a new curriculum that was to be introduced later in 2023. This new curriculum will be the foundation of the accreditation procedure. Evidently, it is necessary that this curriculum be accessible to all interested parties, which at the time of the audit was not yet possible to check. After the audit, the assessors could ascertain that the curriculum is available online.

The major change to the new curriculum is the introduction of three minors into the degree programme, called a "general minor", an "intelligent industrial systems minor", and an "industrial analytics minor".

Structure and content of the degree programme

The study programme at hand comprises four years of study in which a total of 150 VN credits can be acquired, which corresponds to 250 ECTS total. The credit load is divided in about 18 to 21 VN credits (29 to 33 ECTS) in seven semesters, with a final thesis being placed in the eighth semester worth 10 VN credits (16 ECTS). Additionally, there are minor courses allocated to a summer semester (e.g., courses of Marxism and Leninism for 5 VN credits (8 ECTS); an internship à 2 VN credits (4 ECTS); and an obligatory military training). Factoring out the courses outside of the subject area, the lectures in industrial engineering amount to approximately 180 ECTS.

Since the university is striving for internationalisation, all courses are held in English exclusively. The choice out of the three minors mentioned above is a new addition to the curriculum, granting the students the chance to either take specialisation courses in "intelligent

industrial systems", or in "industrial analytics". Alternatively, they may choose to study a general minor, which includes courses on experimental design and probabilistic models. While the foundational courses of all minors are equivalent, 6 VN credits in the sixth semester are reserved for two courses on the special interest. Additionally, students choose one out of three courses à 3 VN credits in the fifth semester, and another two in the seventh semester out of eight offers. Furthermore, in this semester the students are encouraged to take an additional course out of 28 offers to get a look of the wider picture of industrial engineering.

In the freshman year, students begin learning the foundations of mathematics, physics and chemistry, with an additional focus on advanced English language courses. The second semester includes first contact with industrial engineering. In the second year, students begin building on the scientific foundation by learning about computing, engineering, and project management. The courses then become more specific, building more specialised knowledge in the respective fields, starting in junior year. This is also where the above-mentioned minors come into play: The "intelligent industrial systems minor" features courses in industrial intelligent systems and advanced industrial big data analytics in the sixth semester, while the "industrial analytics minor" features courses on predictive data analytics and applications as well as industrial and commercial data systems. The third year also contains the first elective courses, where students are enabled to choose their own field of interest to pursue further. The last year features a capstone as well as the thesis. The capstone is a group project in which the students are supposed to use their knowledge gathered in the theoretical and practical parts of their field of study to solve a real-world problem. It furthers teamwork and abilities in engineering design, as well as presentation of results. The final thesis is a written examination, the subject of which is chosen by the student and may comprise theoretical research or solving of an actual problem in the field.

A part of the study programme at hand are two internships, one to be taken in the second year's summer semester, the other one in the third's. The first internship is short, lasting only five days, and encompasses field trips to different industries in groups to catch a glimpse of the workings of different factories and get a first understanding of the labour market. The second internship takes place at the end of the third year. It is an individual work at a company for at least eight weeks, preferably longer. During this time, each student is assigned an advisor from the university and from the company for assistance. Both internships are finished with a written report. Industry partners also regularly take part in "industry talks", in which they show presentations or have discussions with students about business and the work performed at their company.

The curriculum design is largely aligned with the ILOs and complies with IU procedures. Firstly, the curriculum is designed according to the programme's expected learning outcomes. The curriculum is then categorised into different groups of courses, such as generic courses, foundation courses, specific courses and elective courses. Teaching and learning is then planned according to the curriculum and course with various methods of delivery, including practical lab courses and sessions. Interactive instruction and independent study are encouraged over the programme to train the student with life-long learning skills.

The assessors discussed the curriculum during the audit and agreed that its structure is logical. The knowledge the students acquire in each course is well aligned so that the there are no knowledge gaps in prerequisites. This was confirmed by the students during the audit. The assessors consider the two internships a positive addition to the learning process in which the students cat get a glimpse of the working life early in their studies and play an actual part in a company later during the second internship.

Generally, the structure of the programme enables the students to achieve the ILOs. One exception to that is a lack of courses regarding Services in the curriculum. The university lists "Practicing engineering in the field of production and services" as their first ILO. The assessors find that the curriculum does not put sufficient focus on this subject. In the Student's Handbook the university lists "optimization of production and services" as a career opportunity; according to the curriculum, however, the examination of services specifically appears to remain at surface level within courses about "multi-criteria decision making" and "systems engineering". This should be rectified by re-working the curriculum to appropriately reflect the field of services as part of the study programme.

Students are regularly able to finish the degree programme within the four years set by the university. An exception to the four years are students who struggle with English. If their English proficiency during enrolment is lower than 5.5 IELTS, students need to take an extra semester or year, depending on the proficiency, to get to the required level of language proficiency. This is regularly counted towards the years studied, so obtaining a degree after five years is not unusual and not worrisome, since the students enrol with the knowledge about whether they need to take these additional language courses or not.

Student mobility

As an international university, student mobility is deemed an important factor of the study programme. The university has a Center for International Mobility (CIM), which is supposed to assist students with mobility programmes. The university offers student exchanges,

studying abroad and cultural exchange programmes. The former two are long-term exchanges with both partner and non-partner universities and the latter is a short-term programme.

Outgoing students of IU-VNU may attend one or two semesters at a partner university after one year of full-time study and before the defence of the graduation thesis. They need to have a GPA of at least 68/100 and have completed the two courses of Advances English and Calculus. Since English is the language of instruction, outgoing student do not regularly need an English proficiency certificate. Incoming students must have been enrolled for at least one year at their home university to apply for a full-time study (no less than 14 credits per semester). Lastly, the students need an English proficiency of at least B1 in the Common European Framework of Reference. The university has an extensive list of partnerships with higher education institutions the world over, but despite this big offer the amount of both outgoing and incoming students in the programme remains quite small. The students present at the audit were interested in going abroad, but stated that access to information about exchange programmes were scarce. Generally, the information about exchange programmes is easy to find on the designated website of CIM (https://cim.IU-VNU.edu.vn/) but there appears to be no incentive be the faculty to promote these exchanges. The teachers confirmed that there was room for improvement in advertising student mobility in the future. Students with international experience reported their time as positive. They confirmed that there was no problem with crediting the courses taken aboard.

Periodic review of the curriculum

The curriculum is regularly reviewed every year by the School Advisory Board. This board consists of senior lecturers and other experts in academia and the industry. According to the self-assessment report, the board's goal is to measure the achievement of the ILOs and to ensure that the expectations of all stakeholders are met. The board does so by analysing the scores of classes and theses and by surveying students and alumni. The self-assessment report states that these surveys also include the industrial partners, but as was said in criterion 1.1, the assessors got a rather distant impression of the connection between university and industry. It appears that the industrial stakeholders are informed of changes to the curriculum after the fact and have a chance to give feedback then; The industry representatives present during the audit stated, however, that it would be much more helpful if they had more direct influence on the curriculum design. The experts agreed that the general exchange between academia and the industry could be strengthened. The industry talks are already a good way to do so and strengthening open discussions would help everyone involved (i.e., students, lecturers and the industry representatives) to improve the exchange between the parties. This would ultimately also improve the quality of the internships.

Lastly, all changes to the curriculum are well documented with reasons for revisions given.

Criterion 1.4 Admission Requirements

Evidence:

- Admission regulations
- Admission methods
- Entry requirements and procedures for international students
- Guide to English placement test
- Statistical data about the progress of studies of ISE students
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

There are several ways for students to be admitted to IU-VNU. The usual selection procedure is a national entrance examination organised by the Ministry of Education and Training of Vietnam, which also sets the minimal requirements to pass this test. At least half of the admission comes from this selection method. A prioritised admission procedure with a quota of up to 15% is granted to students who excelled during the last three years of a high school that is listed as an excellent high school by VNU-HCM. A very small number of students from other Vietnamese high schools (about 1%) is eligible to enrol based on a recommendation of the high school. These students do not need to take part in the national entrance examinations. VNU-HCM and VNU-HN (Vietnamese National University Hanoi) organise their own scholastic aptitude test (SAT) the result of which may be used to apply with the university (up to 45%). Finally, up to 10% of applicants may be admitted with foreign high school diplomas. The applicants must prove that the last three years of high school was deemed good at least and take part in an interview with an Admission Committee.

Since the language of instruction at IU-VNU is English, students need a proof of English proficiency, which needs to be at least a 4.5 of IELTS. If they cannot provide such proof they need to take part in a proficiency test at the university. Depending on the English level, students are to take one semester (IELTS under 6.0 but over 4.5) of intensive English courses. The three English courses are assigned according to necessity. All in all, the course

of study might be prolonged by one or two semesters depending on the amount of English courses that are to be taken at the time of application.

In the last six years the number of applications for the study programme under review here was about 370 per academic year, with the highest amount of applicants being in 2018 (616) and the lowest in 2017 (257). The number of applicants currently ranges in the three-hundreds, with a small decline from during the COVID-19 years of twenty applicants per academic year. The general number of admitted students ranges around 70, with the lowest number of enrolment being 2022 with 55 freshmen. The university writes that the number of applicants, while declining, is still quite high, but the decreasing interest in Industrial Systems Engineering appears to be a trend that is observed among several Vietnamese universities. IU-VNU states that, as a countermeasure, it is necessary for the faculty to actively participate in admission counselling. Furthermore, the department has begun to offer more scholarships and other means of financial aid to attracts students who might be deterred by the tuition fees. On a university and faculty level, the partnerships to the industry have been and will be developed further to offer ample opportunity and incentives for future jobs.

The assessors see no problems with the admission procedures for both Vietnamese and international students. They discussed the decreasing number of applicants and see that the countermeasures taken to attract more students are sensible. Generally, IU-VNU allows for credit transfer from other universities within the same major.

Criterion 1.5 Workload and Credits

Evidence:

- Student handbook
- Student evaluation report
- Self-assessment report
- Diploma supplement
- Discussion during the audit

Preliminary assessment and analysis of the experts:

In general, each credit is equivalent to 15 periods of theoretical lectures in class or 30-45 periods of practice in the laboratory with 30 periods of self-study. In the internship, each

credit is equivalent to 45-90 periods. A credit regarding projects, such as chemical engineering project and the final thesis, is equivalent to 45-60 periods. One period lasts for 50 minutes. This model of calculating credit points leads to inconsistencies: According to the ECTS credit system, 1 ECTS equals 25-30 hours of students' workload. As a result, there cannot be the same conversion rate between Vietnamese credits and ECTS points for all courses. IU-VNU assumes that 1 ECTS is equal to 27.5 hours. For theoretical lectures, the rate would be 1.54 and for practical work 2. Moreover, IU-VNU specifies a range of possible applicable periods for laboratory work, quizzes in class, assignments, project work, internships and thesis. These can therefore vary from student to student and are not fixed.

The total amount of credits to complete the Bachelor's programme at hand is 150 VN credits. This is in line with Vietnamese government regulations; which state that engineering degrees must consist of 150 VN credits at least. As was said before, during the first seven semesters, students must take between 18 and 21 VN credits (29 to 33 ECTS) per semester, and 10 VN credits (18 ECTS) in the final semesters. Each semester last for 15 weeks, with a first semester from September to January and a second semester from January to June. Additionally, there are minor courses outside of the subject area allocated to a summer semester, which takes place for seven weeks from June to August. These courses are mandated by the government (e.g., two courses on philosophy and political economy Marxism and Leninism for 5 VN credits (8 ECTS) in the first year or a military training which does not count toward the credit load in the second year). Furthermore, students take an internship à 2 VN credits (4 ECTS) during one week in the second summer semester, and a longer internship in the third semester. By and large, the credits to be acquired during these summer semesters amount to 10 VN credits. Factoring out the courses outside of the subject area, the lectures in industrial engineering amount to approximately 180 ECTS. The credit load per semester, when subtracting the courses from the summer semesters, varies between 18 and 21 in the first to seventh semester. Students must not register more than 23 credits or less than 12 in this time. The eighth semester is dedicated to the Bachelor's thesis, which is why this semester offers only 10 credits. Structural peaks are avoided while the curriculum does follow a stringent line from foundational to specialised courses.

An evaluation of students' opinion about the workload shows that about 35% of students are content with the workload as it is and about 20% consider it too easy. About 30% find the workload challenging with about one in ten finding it too heavy. About one in three students would suggest to reduce the workload, with the rest being content or would even increase it. These figures show that there is a slight tendency by the students to judge the workload as too high. For this evaluation it needs to be taken into account, however, that most of the students surveyed were from earlier batches in which the workload was higher and structurally different. The workload was subsequently lowered in a later batch to 148

VN credits and streamlined into the current three minors. The experts judge the workload to be considerable, especially in regard to the mandated courses by the government, but still agree that it is manageable without lowering or re-allotting the current structure of the workload. This opinion was corroborated by the students, who took part in the discussion during the audit. They stated that the workload did not pose any particular challenge to them. Failing courses was an occurrence rare enough that students were not able to elaborate on the process apart from the basics: If a student fails a class they may take the exam again before the start of the next semester. Additionally, they may ask the lecturer to open a course to revisit the material during the summer semester.

The programme is designed for a study time of four years, or taking into account the level of English needed to be accepted into the programme, it may take five years. The following table shows data for the graduation time from 2014-2018, with listings of the English level of the enrolled students (from lowest to highest level: IE1, IE2, AE):

Cohort	2014	2015	2016	2017	2018	Average
Total intake	44	69	57	78	91	67.8
% IE1	63.6%	47.8%	47.4%	42.3%	46.2%	49%
% IE2	29.5%	40.6%	42.1%	37.2%	38.5%	38%
%AE	6.8%	11.6%	10.5%	20.5%	15.4%	13%
% Graduated in 4 years	34.1%	42.0%	43.9%	25.6%	20.9%	33%
% Graduated in 5 years	29.5%	21.7%	15.8%	28.2%	N.A	23%
% Graduated >5 years	6.8%	5.8%	5.3%	N.A	N.A	6%

1 Different English levels and graduation time of cohorts 2014-2018, taken from the self-assessment report, p. 77.

About a third of students manage to graduate within the intended timeframe of four years, while 29% take five or more years. As was said, one year of this might count toward acquiring the needed level of English, which is counted as part of the study programme. Interestingly, about 30% of the students do not graduate at all. The drop-out rates rise from 2% in the first year to 12% in the final year. While the university does conduct surveys with the drop-outs, it appears that about half of the former students do not name any reason for their quitting. For 28%, a study abroad was a reason for dropping out, whereas one in ten name financial issues as their reason to part from the university. Interestingly, during the audit, students claimed that many are headhunted by the industrial partners after the second internship with attractive salaries, so that students do not finish their thesis and begin

working without an official degree. However, this claim is not reflected in the statistics of the university.

In a nutshell, the workload of the study programme at hand is quite high because several courses and the internships are allocated to a summer semester, which reflects an additional seven weeks of studying during an academic year. This surplus of work can be considered a trade-off for more time at the end of the study, when students are performing an internship, their capstone, and a thesis. The assessors and the students agreed that this trade-off is worth it. Still, with the recent change to the curriculum the School of Industrial Engineering and Management needs to pay close attention to any shifts in the workload and the reaction of the students. Finally, IU-VNU should analyse more closely the reasons for students to drop out of university just before graduating and find measures to counter this trend.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Student handbook
- Evaluation results
- Syllabus and module handbooks
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The School of Industrial Engineering & Management follows the university's educational philosophy, founding programme contents and their delivery on the four principles called Comprehensive, Liberal, Pioneering, and Global. Comprehensive means that the programme is supposed to train all-round individuals who have knowledge in the specific fields of the degree programme. Liberal designates the preparation of students for a globalised world. Pioneering refers to the generating of new knowledge and innovation, and global signifies internationalisation and global recognition of the university.

The courses are designed in a student-oriented way, which means that, regardless of the individual teaching and learning strategies a lecturer may employ, the focus is always on the students' needs. Students have an advisor during their study programme whom they can regularly consult if questions arise. Course objectives and syllabi are discussed at the beginning of each course and the role of a course within the curriculum is explained. The student handbook also gives all necessary information.

Teaching methods employed at the university are varied. Next to theoretical courses, the university offers lab courses to connect theoretical knowledge to its application. Several labs help the students to work with professional software and to run simulations and to familiarise themselves with common equipment used in the industry. There is an emphasis on collaborative learning, in which group work is strengthened for assignments, projects and laboratory experiments. The capstone, a bigger projects near the end of the study programme, is also a group projects, in which students are to solve actual real-world problems in the industry. This practical work is complemented by two internships, in which the students learn to work in the field. After the COVID-19 pandemic, online-learning via Zoom or Microsoft Teams has surged, with the possibility for online learning still present today.

Teaching methodology and didactics are regularly evaluated, for one by surveying the students, and by assessing the student outcomes. Based on the analysis of the students' feedback, the school dean or department chair meets lecturers privately to discuss criticism and room for improvement. Generally, though, the performance is ranked between a 4-5 out of 5, which is the university's self-proclaimed goal.

The assessors have no concerns about the quality assurance and are certain that the feedback of students is taken seriously and actively is used to improve the study programme. Practical work is included in the curriculum and the assessors consider the amount and variety (i.e., academic practical work, internships, and the capstone) sufficient.

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

Regarding the involvement of the industrial partners in the curriculum design the university has written the following statement:

At present, our industrial partners are involved in our program through the following activities:

- Industrial talks (seminar)
- Workshop
- Course invited speakers

- Internship and company visiting
- Industrial projects
- Training courses for companies.
- Advisory Board
- Surveys on program expected learning outcomes, program curriculum and students/alumni performance.

Our plan to enhance the industrial collaboration:

- Strengthening the alumni network to serve as a vital bridge between the school and the industry. To kickstart this effort, we are organising the inaugural alumni reunion event in June 2024.
- Hosting annual industrial meetings to foster stronger ties within the industry network and facilitate the exchange of information regarding the needs and requirements of both par-ties.
- Introducing a specialised master's program designed to meet the specific needs of partnering companies. As an example, in the upcoming semester, 15 employees from Lazada are slated to begin pursuing their master's degrees at IU.

The university can prove that many efforts are already being taken into account to enable strong ties with industrial partners. The expert panel is certain that the future action, especially the annual industrial meetings, will be a step in the right direction.

For the curriculum the university has provided a list of courses and respective content about services:

Courses	% content related to service subject	Description
Project management	30%	Application cases in service: - Project charter - Work breakdown structure - Project completion time - Project Stakeholder
Quality management	30%	Application cases in service:

		- Philosophy of Total Quality Management - Continuous improvement - Control charts (hospital) - 6 sigma
Simulation models in IE	50%	Modelling assignments and projects: Call centres, hospitals, banks, supermarkets, distribution centres, ports, airports, restaurants
Scheduling and sequencing	40%	Workforce scheduling in service firms (eg.hospitals), scheduling in reservation systems and timetabling (eg. hotels, airports)
Lean production	30%	Lean principles applied in service firms (identify wastes, 5S)
Inventory management	50%	Applications for different echelons in the supply chain service
Time series and forecasting	50%	Forecasting in service sector
Multi-criteria decision making	50%	Applications in services. Eg. Locations selection for service facilities, supplier selection and evaluation, employee performance evaluation, service portfolio optimization
Systems engineering	50%	Applying systems engineering principles to improve service systems, ensuring they are efficient, reliable, and capable of meeting customer needs

According to this table, there are enough courses about services throughout the curriculum. This density of services as course content does not warrant any changes according to the assessors.

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, Concept and Organisation

Evidence:

- IU Exam Regulation
- Syllabus and module handbooks
- Program Specification (2017/2019)
- Guideline to course assessment analysis
- Self-assessment report
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Every course in the Bachelor's study programme at hand is finished with an examination of the students at the end of the semester. Furthermore, there is a mid-term exam. Both kinds of examinations are conducted in a designated week in which there is no teaching. The students are informed of the times and locations the exams are held in advance, at least one week before mid-terms and two weeks before finals. Every course contains a final exam and one semester contains six to eight courses.

At the beginning of each course, the instructor informs the students about the assessment plans and criteria towards the course outcomes. These are also published in a program specification, which contains a syllabus with all relevant information for each course in the study programme. It includes, among others, the designated semester of instruction, the language to be taught in, teaching methods, workloads and credits (with conversion to ECTS), as well as each module's objectives and learning outcomes. It also features examination forms and regulations. The learning process is assessed by a variety of methods. A written examination is the general form of assessment in the mid-term and final exam. The students are provided with several questions which they must formulate answers to. Throughout the course, students are continuously assessed through a variety of teaching methods, among them multiple-choice quizzes or short exercises that will be similar to an exam, as well as home assignments and project presentations. During the audit, the students described the amount of examinations throughout the semester as appropriate. They stated that there were several small tests throughout the semester which would force them to regularly review the material. They summarise these small tests as a net positive.

Generally, an exam can be taken at a later date if a student can demonstrate that they are unable to attend. In these cases, a separate date is given to take the exam. Alternatively, they can retake the examination in the following semester. Attendance of at least 80% of the course time is mandatory to be eligible to take part in the final examination. If a student fails an exam, they have the chance to ask for a separate course to be opened in the summer semester to have the contents taught to them once more. They then can take an exam at the end of the summer semester.

The final examination in the Bachelor's study programme is the Bachelor's thesis. Students may start it once 90 % of the total credits have been acquired. It is an individual and mandatory study that may contain a practical problem and its solving, or theoretical research. It is structured into a thesis proposal, a midway defence and a final defence.

The relationship between the exams and the learning outcomes that they are supposed to measure is regularly assessed and adapted if necessary. To measure the interconnectedness of learning outcomes and the assessment method, the percentage of students who get more than the pass score of each criterion is calculated and compared to a threshold. This data is collected over three years and then evaluated. If a criterion does not meet this threshold, there are several actions to be taken. For one, the course content or the curriculum design may be updated. On the other hand, the teaching itself may need improvement which then results in, e.g., training courses.

During the audit, the experts were able to confirm that the examinations are actually structured as given in this report. They find that the students are prepared well for the examination times and all information about courses, exams, and rules is readily available. The examinations that were presented to the auditors showed a varied set of questions that were in line with the requirement profile of a course. The Bachelor's theses demonstrated a just and transparent grading systems, and it was the general gist of the auditors that graduates have a command of scholarly work and the subject matter.

During the discussions, the auditors received contradictory statements about the process of filing grievances about examination results. If students feel like their examination results are incorrect, they may file a complaint. The timeframe given varied throughout the discussions from about a week to less time. For this matter, the auditors recommend that the filing of grievances be systematised. Ideally, this timeframe should be long enough for students to actually be able to file a complaint after exam results have been published.

Other than that the auditors were content with the system, concept, and organisation of exams in the Bachelor's degree programme at hand.

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

The experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 Staff and Staff Development

Evidence:

- IU teaching regulation
- Faculty surveys
- IU development strategic plan 2021-2025
- Recruitment plan
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The duties for academic staff are laid out in the IU teaching regulation and each labour contract. The general responsibilities of academic staff encompass teaching, research, and services. The latter consists of organisation of cooperation or coordination of programmes, as well as development of e.g. training programmes. Further activities include the improvement of professional qualifications. Lecturers are required to teach 270 periods per and have 0.5 or 1 research point(s) depending on their academic degree (Master's or PhD, respectively). A research point corresponds to either a publication, a patent or a technology transfer project.

The academic staff consists of professors, lecturers, and visiting teaching staff. According to the self-assessment report, the number of staff is currently high enough to cover the curriculum in an adequate manner. As of 2022, the student-to-staff ratio was 8:1, taking into account a calculation defined by the Vietnam Ministry of Education and Training, in which a higher academic degree corresponds with more staff (e.g., a professor counts as 5 members of staff). The recent development of the student-staff-ratio can be seen in table 1 below.

	2017	2018	2019	2020	2021	2022
Number of Professors	0	0	0	0	0	0
Number of Associate Professors	1	1	0	0	1	2
PhD degree holders	7	7	7	7	7	7
PhD candidates	0	0	0	0	3	3
Master's degree holders	11	11	10	12	10	10
Bachelor's degree holders	6	6	7	4	6	8
Number of lecturers	13	13	12	12	12	13
Number of staffs defined by Ministry of Education and Training's decree	29.8	29.8	26.1	27.2	34.8	38.4
Number of students of Program	258	278	285	301	313	292
Student-to-Staff ratio	9 :1	9:1	11:1	11:1	9:1	8:1

2 Student-to-Staff ration from 2017 to 2022, taken from the self-assessment report, p. 51.

The university plans to further the academic degrees of their academic staff to four associate professors (from two in 2022) and eleven PhD holders (from seven in 2022). This is also in the interest of the experts who, during the audit, consequently worried about the lack of full-time professors in the study programme. According to the faculty's recruitment plans, a professorship is planned for the year 2025 and the number of associate professors is to be incrementally increased to 4 by 2026, but this is a scarce outlook. The discussions at the university cleared up, however, that the title of a professor is granted under different circumstances and is a much more time-consuming and laborious process. The assessors understand that these differences in the academic systems are responsible lack of full-time professors and the small number of associate professors. They think, however, that the university should keep in mind the constant development of the academic degree of their staff. They recommend to help further the staff's academic careers.

The satisfaction of the staff is regularly assessed via an annual questionnaire called Feedback Survey. In the survey the staff is asked about teaching, research, workload, and demands as well as services. In a survey from 2022, 100 % of the teachers who took part in the questionnaire were content with the teaching facility and library service, for example; but the teaching workload was adequate according to only 63 % of teaching staff. This is a significant drop from 92 % in 2020. During the audit, the lecturers stated that teaching takes up most of their time, with supporting their students being most demanding. This has, according to the lecturers, consequences for their other activities at university so that only 63 % managed to do research in 2022. In the self-assessment report the faculty acknowledges this by conceding that the low participation in research "could be due to the heavy teaching workload" (p. 54). The high workload indicates quite obviously the lack of

personnel that would equalise the time spent on teaching. To combat this the university plans to increase their staff by recruiting two more lecturers by 2024 getting a total of 11 PhD holders by 2026. This would bring the number of professors to 1 full-time and four associates. The assessors are certain that the recruitment will gradually alleviate the high teaching workload and they understand that staff development takes time. Still, they want to urge IU-VNU to keep a close eye on the teaching workload and lecturers' satisfaction in the coming semesters. An excessive demand on the lecturers does not solely affect the participation in research activities, it can also compromise the quality of teaching and the support for the students.

Apart from the workload the lecturers are content with IU-VNU. They are especially content with services offered by IU-VNU, with satisfaction being measured between 80-95 % in the faculty survey. The lecturers may attend conferences and other professional events regularly with expenses being covered by the faculty. There are opportunities to take part in faculty exchange programmes, e.g. with the University of Reutlingen, Germany, as well as local, industrial projects. Furthermore, lecturers receive regular pedagogy courses to improve their teaching skills.

Every five years, the faculty analyses surveys about the proficiency of staff to find deficits and room for improvement. According to their findings they establish training plans for five years in which they present the results of the survey and how to adapt these findings. Training courses might include knowledge gaps about particular topics of the programme (e.g., due to the growing prevalence of AI), but also soft skills or English courses.

The lecturers present at the audit confirmed that positive impression of the services offered by the faculty and the continuous effort from the university to further the competencies of their staff. The assessors agree with this impression and judge the services of the university as adequate.

Criterion 3.2 Funds and equipment

Evidence:

- Program budgets from 2019 to 2023
- ISE staff project funded by internal and external grant (list)
- Report on IU service quality for students and staff
- Lab regulations
- Library database website: https://library.IU-VNU.edu.vn/research/database

- Self-assessment report
- Discussion during the audit
- Tour of the faculty

Preliminary assessment and analysis of the experts:

The general budgeting for each programme is planned annually in March and depends on the mission. Proposed budgets will be considered by the Office of Finance and Planning and then are approved by the Board of Presidents. Furthermore, there are temporary funds that can be allocated from different industries or organisations. The programme budget for 2023 amounted to 2.239 million VND (~85,000 EUR).

Research activities can be funded with further research grants separate from the annual budgets on either the level of the university, of the National University level (i.e. the association) or a National level. From 2017 to 2022, the university allocated funds for 22 different projects, amounting to 454 million VND (17238 EUR). Finally, the university provides annual funds for the repair and procurement of equipment according to requirements from researchers and lecturers. The staff proves generally content with the procurement processes and the time they take.

During the audit, the assessors received a tour of the faculty, including the laboratories, of which there are four: the human-machine interface lab, the FMS & automation lab, the work & product design lab, and the simulation lab. The assessors could make sure that the labs are functional and well-equipped, both with adequate machinery and personnel. The laboratories adhere to safety standards and provide enough infrastructure to teach and do research. The rest of the faculties, e.g. classrooms, are equally as suitable for their purposes.

During the audit, the staff and students confirmed that equipment, rooms, and infrastructure are adequate for research and teaching purposes. There are sufficient class rooms and enough equipment to ensure that students can use the same devices simultaneously in class. The students showed satisfaction toward the equipment and infrastructure at IU-VNU both in the annual surveys as well as during the audit, saying that they do not have any concerns regarding the class rooms, the self-learning centres, and the library. The library features a physical collection of over 30.000 items and 80.000 e-books. Students and staff have access to about 7.000 journals and databases such as Springer, ScienceDirect, and IEEE.

The department has over time increased the software to be used, with Matlab, ARENA, and MasterCam being utilised to support some courses, such as Introduction to Computing or Management Information Systems. In 2022, SAP was added to the list of software. During the audit, it was Matlab especially that was discussed. The software is not licensed to individual students, which at first raised the assessors' suspicions about the students having no or little access to using the programme. It turned out, however, that the programme is readily accessible via computers at campus. This poses no problems to the students, who confirmed that they can make use of all software without waiting times for free computers.

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

The experts consider criterion 3 to be fulfilled.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Student handbook
- Module descriptions
- Brochures
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The module descriptions are standardised throughout the course syllabus and include all relevant information. Among these are the general overview (which includes the course name and its code, the semester in which the course is taught, the person responsible, as well as the language of instruction) and information in relation to the curriculum (course content, workload and credit points, prerequisites, course objectives and learning outcomes and examination form and requirements), as well as a suggested reading list. The

module description features, furthermore, planned learning activities and teaching methods and assessment plan and an optional learning outcome matrix. Lastly, the date of the last revision is indicated.

The module descriptions are printed in the student handbook and distributed to all students and other relevant parties (i.e., visiting lecturers, management board, stakeholders …). Furthermore, the information is available on the internet (after log-in) and in brochures. The necessary information is given to all parties.

The assessors confirm that the module descriptions are diligently crafted and contain all relevant information. The stakeholders, too, acknowledge that the module handbooks are well composed.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Exemplary diploma and diploma supplement
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

Upon graduating the students receive a degree certificate and a diploma supplement. The latter is given in English and provides information about the student's qualifications profile and individual performance in every course taken. The diploma supplement shows a table with a point grading scale in letters and in 100 points and gives a conversion table between those and GPA classifications. Furthermore, it gives both credits used internally and conversions to ECTS. The diploma supplement contains almost all necessary information with the only exception being data about grade distribution. The assessors suggest that this data point be included in the diploma supplements to be handed out in the future.

Moreover, it needs to be said that an exemplary diploma supplement for the new curriculum has not yet been seen by the expert team. The university needs to make sure that the necessary information on the diploma supplements is also given for the 2023 batch, including the minors chosen.

Criterion 4.3 Relevant Rules

Evidence:

- Student handbook
- Program specification
- Website: https://iem.IU-VNU.edu.vn/regulation-decree/
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

Relevant rules and regulations are published on the website of the faculty. The student handbook, handed out in print and as a link at the beginning of freshman year, also contains the rules and regulations. Academic regulations are also mentioned in the Program Specification of the study programme at hand.

The students confirmed during the audit that the rules and regulations are clear and easy to find. There are no qualms about the transparency and availability of relevant rules for students on faculty and university level.

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

The experts consider criterion 4 to be partially fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Internal and external QA plans
- Quality assurance handbook

- Records of curriculum changes
- Self-assessment report
- Discussion during the audit

Preliminary assessment and analysis of the experts:

As was mentioned throughout the report, IU-VNU conducts regular quality assessment to develop and improve the conditions for all internal and external stakeholders. This is done by the Office of Quality Assurance and Testing (QATO), mostly in the form of annual surveys, e.g., of students, alumni, companies, and staff. According to the findings of the analyses QATO suggests changes to the Board of Presidents, the highest academic council at IU-VNU. They then implement these suggestions, which results in curriculum changes, revision of recruitment plans and new strategic planning.

Generally, the assessors were given the impression that IU-VNU is quite receptive of feedback and eager to put into practise measures that improve less-than-optional situations. During the audit, the staff and students confirmed that feedback is accepted and implemented wherever possible. As was said in criterion 1.1, the industrial partners stated that their involvement was restricted to giving feedback to curricular changes. Here, QATO might reconsider how to incorporate the annual surveys better to get a more detailed opinion from the industrial partners.

Apart from the industrial stakeholder, students and alumni are also included in the review of the curriculum and the general internal quality assessment. For one, students and alumni are invited to take part in surveys, both online and in-situ, regarding different parts of the quality assurance and in different stages of their study. Students get the chance to take part in a freshman survey in the first year as well as an exit survey. Annually, there are studies about the university's services quality as well as the curriculum and the ILOs. Course evaluations are conducted after every course. Alumni have the chance to take part in surveys about the ILOs and about their career and a retrospective of their time at university. As was mentioned earlier, the drop-out rate of students is quite high, especially in the fourth, i.e. the last year of study. There appears to be no reason for the sudden spike at that particular time on the Bachelor's programme, which the assessors recommend to put a higher analytical focus on. On discussion with the students at the audit they conjecture that the industry might offer jobs to students in their senior year after the internship. The students then might prefer the attractive salary to the last stretch of the study and drop-out. This should be verified but, regardless, countermeasures for this high rate of dropping

should prove worthwhile. Finally, the assessors have the impression that the feedback of the students regarding courses is not given to the students themselves. In order for the feedback loop to be closed, the experts suggest that the university notifies the students about changes that are put into practice because of the feedback received. This way, the students get the impression that their opinion is taken seriously and that their feedback is actually helpful.

Lastly, the academic staff is also regularly interviewed about their experience at the university. This encompasses feedback for the faculty, the services quality and training needs. Based on the answers to the latter, the university prepares courses for the teaching staff to assist them to get better.

QATO is also responsible for analysing data and process data into useable and actionable information. They make annual plans for internal and an external quality assurance activities, suggesting, for example, timelines corresponding to activities, such as accreditation procedures up to 2025.

The assessor are, in general, very content with the quality assurance at the levels of the university, the faculty, and the department. The surveys are sensible and aim at the improvement of the various units of the study programme. Data is kept meticulously and is analysed to guarantee an internal understanding of the workings of the university, its stakeholders, students, and alumni.

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

Regarding the closing of the feedback loop in the student surveys, IU-VNU has implemented the following methodology:

To ensure a closed feedback loop, we have implemented the following measures:

- All students have access to QATO's website to participate in surveys conducted by QATO (https://qato.IU-VNU.edu.vn/Surveys)

- Improvement reports following surveys are published on QATO's website and are accessible to all students.

- The procedure for submitting a complaint is outlined on the IEM website (https://iem.IU-VNU.edu.vn/iem-voice/). Responses from the Case Resolution Committee will be posted on the IEM Bulletin (located in front of IEM office O2.602) within 7 working days from the official receipt of feedback along with complete evidence.

- Starting from this semester, all lecturers are required to hold discussion sessions with students after the midterm and before the end of the course based on student feedback. Lecturers' responses to student feedback are also posted on Blackboard.

The experts consider this a strong enough response to close the feedback loop for the students in the feedback surveys.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution (27.05.2024)

The following quotes the comment of the institution:

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
- **1. THE DEGREE PROGRAM: CONCEPT, CONTENT & IMPLEMENTATION**	
Criterion 1.1 "The stakeholders wished for more involvement in the process, which would ultimately help to ensure the quality of the programme" (Page 9) … "It appears that the industrial stakeholders are informed of changes to the curriculum after the fact and have a chance to give feedback then; The industry representatives present during the audit stated, however, that it would be much more helpful if they had more direct influence	At present, our industrial partners are involved in our program through the following activities: - Industrial talks (seminar) - Workshop - Course invited speakers - Internship and company visiting - Industrial projects - Training courses for companies. - Advisory Board - Surveys on program expected learning outcomes, program curriculum and students/alumni performance. Our plan to enhance the industrial collaboration:

<table>
<tr><th>PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS</th><th>RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT</th></tr>
<tr><td>on the curriculum design. The experts agreed that the general exchange between academia and the industry could be strengthened. The industry talks are already a good way to do so and strengthening open discussions would help everyone involved (i.e., students, lecturers and the industry representatives) to improve the exchange between the parties. This would ultimately also improve the quality of the internships.” (Page 13)</td><td>- Strengthening the alumni network to serve as a vital bridge between the school and the industry. To kickstart this effort, we are organising the inaugural alumni reunion event in June 2024.
- Hosting annual industrial meetings to foster stronger ties within the industry network and facilitate the exchange of information regarding the needs and requirements of both parties.
- Introducing a specialised master's program designed to meet the specific needs of partnering companies. As an example, in the upcoming semester, 15 employees from Lazada are slated to begin pursuing their master's degrees at IU.

Supporting documents Criterion 1.1

- Exh.1.01. Industrial events in year 2023 - 2024
- Exh.1.02. List of Advisory Board Members
- Exh.1.03. Kick-off meeting minute and marketing plan for alumni reunion event.</td></tr>
<tr><td>Criterion 1.3

“Generally, the structure of the programme enables the students to achieve the ILOs. One exception to that is a lack of courses regarding Services in the curriculum. The university lists</td><td>Even though the names of courses in the curriculum appear not relate to “service”, this topic is indeed addressed in various specialised courses in year 3 and 4:

<table><tr><td>Courses</td><td>% content related to</td><td>Description</td></tr></table></td></tr>
</table>

<table>
<tr><th>PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS</th><th>RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT</th></tr>
<tr><td>“Practising engineering in the field of production and services” as their first ILO. The assessors find that the curriculum does not put sufficient focus on this subject. In the Student’s Handbook the university lists “optimization of production and services” as a career opportunity; according to the curriculum, however, the examination of services specifically appears to remain at surface level within courses about “multi-criteria decision making” and “systems engineering”. This should be rectified by reworking the curriculum to appropriately reflect the field of services as part of the study programme.” (page 12)</td><td>
<table>
<tr><td></td><td>service subject</td><td></td></tr>
<tr><td>Project management</td><td>30%</td><td>Application cases in service:
- Project charter
- Work breakdown structure
- Project completion time
- Project Stakeholder</td></tr>
<tr><td>Quality management</td><td>30%</td><td>Application cases in service:
- Philosophy of Total Quality Management
- Continuous improvement
- Control charts (hospital)
- 6 sigma</td></tr>
<tr><td>Simulation models in IE</td><td>50%</td><td>Modelling assignments and projects:
Call centres, hospitals, banks, supermarkets, distribution centres, ports, airports, restaurants</td></tr>
<tr><td>Scheduling and sequencing</td><td>40%</td><td>Workforce scheduling in service firms (eg.hospitals), scheduling in reservation systems and timetabling (eg. hotels, airports)</td></tr>
</table>
</td></tr>
</table>

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT

Lean production	30%	Lean principles applied in service firms (identify wastes, 5S)
Inventory management	50%	Applications for different echelons in the supply chain service
Time series and forecasting	50%	Forecasting in service sector
Multi-criteria decision making	50%	Applications in services. Eg. Locations selection for service facilities, supplier selection and evaluation, employee performance evaluation, service portfolio optimization
Systems engineering	50%	Applying systems engineering principles to improve service systems, ensuring they are efficient, reliable, and capable of meeting customer needs

Criterion 1.3 "The university has an extensive list of partnerships with higher education institutions the world over, but despite this big offer the amount of both outgoing and incoming students in the programme remains quite small. The students present at the audit were interested in going abroad, but stated that access to information about exchange programmes were scarce. Generally, the information about exchange programmes is easy to find on the designated website of CIM (https://cim.IU-VNU.edu.vn/) but there appears to be no incentive by the faculty to promote these exchanges. The teachers confirmed that there was room for improvement in advertising student mobility in the future." (page 13)	At present, the Centre for International Immobility and its various programs are always introduced to the students at the annual orientation week for freshmen. Throughout the year, CIM organises many seminars and workshops to share information about the exchange, overseas internship programs or study tours. This information is always published on its official webpage and fan page (https://www.facebook.com/IU.SEaSAP) which has 12K followers. Besides, CIM also works closely with the school of IEM to share its new event information on the school website and fan page (https://www.facebook.com/school.of.iem/). We do observe the number of IEM students participating in exchange programs increase in recent years. However, to our understanding, the main reason that still limits the number of our outbound exchange students is financial constraint. Our plan to further promote the exchange programs: - Exchange program information is communicated to the academic advisors and is included in the meeting agenda for academic advisors and students every semester. - Looking for more exchange opportunities in the Asia region, which is more affordable to our students. In the past 3 months, CIM has forged new partnerships with universities in Taiwan and Singapore, and announced 04 internship programs at National Chung Cheng University, National Central University (Taiwan) and the National University of Singapore for IU engineering students. **Supporting documents Criterion 1.3** - Exh.1.04. List of students exchange_Outgoing_School of IEM

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
Criterion 1.5 "In a nutshell, the workload of the study programme at hand is quite high because several courses and the internships are allocated to a summer semester…The assessors and the students agreed that this trade-off is worth it. Still, with the recent change to the curriculum the School of Industrial Engineering and Management needs to pay close attention to any shifts in the workload and the reaction of the students." (page 18)	While new courses are being introduced to the curriculum, we are also removing unnecessary ones. The changes for Batch 2023 will take place during the third and fourth years of the curriculum, specifically between 2025 and 2026. We plan to conduct a survey to assess the workload and gather feedback from the students of this batch at the appropriate time.
Criterion 1.5 "IU-VNU should analyse more closely the reasons for students to drop out of university just before graduating and find measures to counter this trend." (page 18)	We have reexamined cases of students dropout at year 4 and above and documented the following reasons - Failure to pass the English exit level within the permissible timeframe of study. - Inability to complete the program within the allowable time frame. - Receiving appealing job offers or successfully establishing their own businesses without the necessity of obtaining a degree. - Relocation abroad.

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
	In the future, we will closely monitor dropout rates and implement the following countermeasures: - Enhancing English support services from the School of English Linguistics. In addition, the university has made it compulsory for students to pass the IE2 English level before they can enrol in specialised courses within the program. This new policy ensures that students attain sufficient English proficiency by the time they reach years 3 and 4 of their studies, facilitating easier completion of the English exit level requirements - Strengthening the academic advising system to support weak students and help them understand the requirements for completing their degree. - Implementing career development programs throughout students' academic journeys to showcase the value of completing their degree. - Providing entrepreneurship education to empower students to see the value in completing their degree while also fostering an entrepreneurial mindset.
- **2. EXAMS: SYSTEM, CONCEPT AND ORGANISATION**	
Criterion 2 "During the discussions, the auditors received contradictory statements about the process of filing grievances about examination results. If students feel like their examination results are incorrect, they may file a complaint. The	The official procedure of filing grievances about examination results is published in the "IU academic regulation under credit system". According to this regulation (article 9, item 15), students can approach the lecturer directly with any concerns about the progress scores and midterm scores within one week after the results are made known. For the final score, they have to file a grievance to the Office of Academic Affairs within 2 weeks after the scores are announced. However, in reality, the filing process is much more flexible, which may create the impression of

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
timeframe given varied throughout the discussions from about a week to less time. For this matter, the auditors recommend that the filing of grievances be systematised. Ideally, this timeframe should be long enough for students to actually be able to file a complaint after exam results have been published." (page 21)	inconsistency. Most lecturers don't mind if students approach them later than the regulated time frame. The Office of Academic Affairs indeed still accepts the filing even when it is longer than 2 weeks for special cases. Another common practice is that the lecturer allows students to review the papers and unofficial results, then he/she would adjust the score if needed before submitting the results to the Edusoft system for official release. While this unofficial time frame for reviewing and adjusting the scores is usually shorter than a week, the students still have the right to file a complaint within the timeframe specified in the regulation after the official announcement. While we believe that both the current regulation and the actual practice do favour students' rights, we acknowledge that it may be confusing to some students. We will highlight this point to the lecturers and students' academic advisors to ensure the policy is clear for all students. **Supporting document Criterion 2** - Exh.2.01. IU academic regulation under credit system
- **3. RESOURCES**	
Criterion 3.1 "..The assessors understand that these differences in the academic systems are responsible for the lack of full-time professors and the small number of associate professors. They think,	We acknowledge this limitation and will closely monitor the development of the academic degree of our staff.

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
however, that the university should keep in mind the constant development of the academic degree of their staff. They recommend to help further the staff's academic careers" (page 23)	The school and the university consistently encourage younger staff to get higher degrees. Throughout the year, the HR office regularly sends out information about different study scholarships to all units. In addition to scholarship, lecturers who leave the school to pursue higher degrees continue to receive partial salaries from the university. We are also actively engaged in discussions with partners such as JU in Sweden and NTNU in Norway to establish exchange PhD study programs for our staff.

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
Criterion 3.1 "...The assessors are certain that the recruitment will gradually alleviate the high teaching workload and they understand that staff development takes time. Still, they want to urge IU-VNU to keep a close eye on the teaching workload and lecturers' satisfaction in the coming semesters. An excessive demand on the lecturers does not solely affect the participation in research activities, it can also compromise the quality of teaching and the support for the students." (page 24) -	We acknowledge this limitation and will closely monitor the workload and lecturers' satisfaction in the coming semesters. In the short term, we leverage invited lecturers and teaching assistants to alleviate the workload of our staff. On average, our school hosts 8 invited lecturers and employs 6 full-time teaching assistants per academic year. Looking ahead, in the long term, our strategy involves continuous recruitment of lecturers and teaching assistants, as well as facilitating their pursuit of PhD degrees overseas. Additionally, we are actively engaged in discussions with partners such as JU in Sweden and NTNU in Norway to establish exchange PhD study programs. Furthermore, we maintain close contact with our alumni who are pursuing PhDs abroad, aiming to attract them back upon completion of their studies. Presently, we have 1 PhD student each in the US, UK, and Australia, 1 in Hong Kong, along with approximately 10 master's students in Taiwan, 5 in Europe, and 3 in the US.
Criterion 3.1 "...Every five years, the faculty analyses surveys about the proficiency of staff to find deficits and room for improvement. According to their findings they establish training plans for five years in which they present the results of the survey	We will incorporate these requirements into our school-level training plan and collaborate with the HR office to address the training needs for soft skills and English proficiency among our staff. Recently, the university has announced the 2024 Digital Talent Development Scholarship Program, organised in collaboration with the National Innovation Centre (NIC) and Google. This program aims to support the enhancement of human resources and the development of digital talents, offering

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
and how to adapt these findings. Training courses might include knowledge gaps about particular topics of the programme (e.g., due to the growing prevalence of AI), but also soft skills or English courses.	courses in Data Analysis, IT Technical Support, UX Design, Project Management, Digital Marketing and E-commerce, Advanced Data Analysis, Smart Business, Cybersecurity. The scholarship value is $168 per slot for online learning via the Coursera.org platform. All faculty and staff currently employed at the International University are eligible for the scholarship.
- **4. TRANSPARENCY AND DOCUMENTATION**	
- Criterion 4.2 - "..Moreover, it needs to be said that an exemplary diploma supplement for the new curriculum has not yet been seen by the expert team. The university needs to make sure that the necessary information on the diploma supplements is also given for the 2023 batch, including the minors chosen." (page 27) -	We attach here a sample format of the diploma supplement for the 2023 batch. **Supporting document Criterion 4.2** - SAMPLE_Diploma Supplement_General_Thesis - SAMPLE_Diploma Supplement_General_NoThesis - SAMPLE_Diploma Supplement_Industrial Analytics_Thesis - SAMPLE_Diploma Supplement_Industrial Analytics_NoThesis - SAMPLE_Diploma Supplement_Intelligent Industrial Systems_Thesis - SAMPLE_Diploma Supplement_Intelligent Industrial Systems_NoThesis
5. QUALITY MANAGEMENT: QUALITY ASSESSMENT AND DEVELOPMENT	

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT
"..As was said in criterion 1.1, the industrial partners stated that their involvement was restricted to giving feedback to curricular changes. Here, QATO might reconsider how to incorporate the annual surveys better to get a more detailed opinion from the industrial partners."(page 29)	IEM has 2 industrial partners involved in the School Advisory Board. They contribute to giving feedback to curricular changes every year. In the future, we will enhance the feedback surveys with our industrial partners by revising the forms to gather more comprehensive opinions and insights. **Supporting documents Criterion 5** - Exh.1.02. List of Advisory Board Members - Exh.5.01. Meeting minute with Advisory Board Members regarding curriculum changes
"..Finally, the assessors have the impression that the feedback of the students regarding courses is not given to the students themselves. In order for the feedback loop to be closed, the experts suggest that the university notifies the students about changes that are put into practice because of the feedback received. This way, the students get the impression that their opinion is taken seriously and that their feedback is actually helpful.."(page 29)	To ensure a closed feedback loop, we have implemented the following measures: - All students have access to QATO's website to participate in surveys conducted by QATO (https://qato.IU-VNU.edu.vn/Surveys) - Improvement reports following surveys are published on QATO's website and are accessible to all students. - The procedure for submitting a complaint is outlined on the IEM website (https://iem.IU-VNU.edu.vn/iem-voice/). Responses from the Case Resolution Committee will be posted on the IEM Bulletin (located in front of IEM office O2.602) within 7 working days from the official receipt of feedback along with complete evidence. - Starting from this semester, all lecturers are required to hold discussion sessions with students after the midterm and before the end of the course based on student feedback. Lecturers' responses to student feedback are also posted on Blackboard.

PRELIMINARY ASSESSMENT AND ANALYSIS OF THE PEERS	RESPONSES FROM SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT

F Summary: Expert recommendations (28.05.2024)

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

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Industrial and Systems Engineering	With requirements for one year	30.09.2029	EUR-ACE®	30.09.2029

Requirements

For all degree programmes

A 1. (ASIIN 1.3) The industry stakeholders should be included in the design of the curriculum.

A 2. (ASIIN 1.5) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.

A 3. (ASIIN 4.2) The Diploma Supplement needs to include statistical data about the distribution of final grades according to the ECTS Users' Guide.

Recommendations

For all degree programmes

E 1. (ASIIN 2) It is recommended to systematize the time span to file grievances about exam results.

E 2. (ASIIN 3.1) It is recommended to put emphasis on furthering the academic degree of the staff.

E 3. (ASIIN 5) It is recommended to increase the exchange of academia and industry (e.g. in the industry talks) to help students, lecturers and industry representatives to improve the quality of internships.

E 4. (ASIIN 5) It is recommended to focus on the high drop-out rate at the end of the study program and find countermeasures.

G Comment of the Technical Committee 06 – Engineering and Management, Economic (10.06.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the requirements and recommendations concerning the bachelor program Industrial and Systems Engineering at the International University. Regarding the requirements, the Technical Committee decides to follow the experts without any changes. Regarding the recommendations, the members decide to rephrase the recommendations E2 to highlight that the professional development of the staff does exceed earning a degree. The proposed wording should further include promotions and additional professional development.

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 parts of Subject-Specific Criteria of the Technical Committee 06 – Engineering and Management, Economics.

The Technical Committee 06 – Engineering and Management, Economics recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Ba Industrial and Systems Engineering	With requirements for one year	30.09.2029	EUR-ACE®	30.09.2029

Requirements

For all degree programmes

A 1. (ASIIN 1.3) The industry stakeholders should be included in the design of the curriculum.

A 2. (ASIIN 1.5) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.

A 3. (ASIIN 4.2) The Diploma Supplement needs to include statistical data about the distribution of final grades according to the ECTS Users' Guide.

Recommendations

For all degree programmes

E 1. (ASIIN 2) It is recommended to systematize the time span to file grievances about exam results.

E 2. (ASIIN 3.1) It is recommended to put emphasis on the professional development of the academic staff.

E 3. (ASIIN 5) It is recommended to increase the exchange of academia and industry (e.g. in the industry talks) to help students, lecturers and industry representatives to improve the quality of internships.

H Decision of the Accreditation Commission (28.06.2024)

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

The Accreditation Commission discusses the procedure and determines to follow the requirements and recommendations of the expert panel as well as the changes of wording by the Technical Committee. The Commission further changes the wording in A1 and E1.

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 Subject-Specific Criteria of the Technical Committee 06 – Engineering and Management, Economics.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation*
Ba Industrial and Systems Engineering	With requirements for one year	30.09.2029	EUR-ACE®	30.09.2029

*Subject to the approval of the ENAEE Administrative Council

Requirements

For all degree programmes

A 1. (ASIIN 1.3) The industry stakeholders have to be included systematically in the design of the curriculum.

A 2. (ASIIN 1.5) Verify the students' total workload and award the ECTS points accordingly. Define how many hours of students' workload is required for one ECTS point.

A 3. (ASIIN 4.2) The Diploma Supplement needs to include statistical data about the distribution of final grades according to the ECTS Users' Guide.

Recommendations

For all degree programmes

E 1. (ASIIN 2) It is recommended to systematize the time span to file appeals about exam results.

E 2. (ASIIN 3.1) It is recommended to put emphasis on the professional development of the academic staff.

E 3. (ASIIN 5) It is recommended to increase the exchange of academia and industry (e.g. in the industry talks) to help students, lecturers and industry representatives to improve the quality of internships.

Appendix: Programme Learning Outcomes and Curricula

According to the Diploma Supplement the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Industrial and Systems Engineering:

1) Practicing engineering in the field of production and services, who

(i) Design or redesign industrial system.

(ii) Operate and manage industrial system.

(iii) Improve the existing industrial system.

(iv) Support for wise decision making.

2) Engaging in lifelong learning to maintain and enhance professional skills.

3) Working effectively with people and demonstrating leadership, professional skills, and ethical behavior in the workplace.

4) Fulfilling the needs of the community and industrial sector of Vietnam in solving technical and management problems using industrial and systems engineering principles, tools, and techniques.

The following curriculum is presented:

Freshman Year (Year 1)					
Semester 1		Crds	**Semester 2**		Crds
EN007IU	Writing AE1	2	EN011IU	Writing AE2	2
EN008IU	Listening AE1	2	EN012IU	Speaking AE2	2
MA001IU	Calculus 1	4	MA003IU	Calculus 2	4
PH013IU	Physics 1	2	PE008IU	Critical Thinking	3
PH014IU	Physics 2	2	PT002IU	Physical Training 2	3
PT001IU	Physical Training 1	3	IS001IU	Introduction to Industrial Engineering	1
CH012IU	Chemistry Laboratory	1	IS102IU	Engineering Drawing	**2**
CH011IU	Chemistry for Engineers	3	PH015IU	Physics 3	3
Total Credits		**19**	**Total Credits**		**20**
Summer Semester		Crds			
PE015IU	Philosophy of marxism and Leninism	3			
PE016IU	Political economics of marxism and leninism	2			
Total Credits		**5**			

Sophomore Year (Year 2)					
Semester 3		Crds	**Semester 4**		Crds
MA027IU	Applied Linear Algebra	2	IS020IU	Engineering Economy	3
IS019IU	Production Management	3	IS103IU	Deterministic models in OR	**3**
IS086IU	Introduction to Computing	3	IS017IU	Work design & Ergonomics	4
IS004IU	Engineering Probability & Statistics	4	IS026IU	Project Management	3
MA023IU	Calculus 3	4	IS034IU	Product Design & Development	3
PE017IU	Scientific socialism	2	PE018IU	History of the Communist Party of Vietnam	2
PE021IU	General Law	3	PE019IU	HCM' s thoughts	2
Total Credits		**21**	**Total Credits**		**20**
Summer Semester		Crds			
IS052IU	Internship 1	2			
	Military Training	0			
Total Credits		**2**			

a) General minor

Junior Year (Year 3)					
Semester 5		Crds	**Semester 6**		Crds
IS091IU	Management Information System with ERP	3	IS079IU	Scientific Writing	2
IS025IU	Quality Management	3	IS028IU	Simulation Models in IE	4
IS085IU	CAD/CAM/CNC	3	IS027IU	Scheduling & Sequencing	3
IS092IU	Data Collection, Analysis, and Applications	3	IS041IU	Lean Production	3
IS023IU	Inventory Management	3	IS031IU	Experimental Design	3
IS104IU	Time Series & Forecasting Techniques	2	IS024IU	Probabilistic Models in OR	3
IS___IU	**ISE Elective Course (choose 1 course below)**	**3**			
IS031IU	Experimental Design	3			
IS106IU	E-Commerce Systems	3			
IS105IU	Cold Chain Systems	3			
Total Credits		**20**	**Total Credits**		**18**
Summer Semester		Crds			
IS053IU	Internship 2	3			
Total Credits		**3**			

Senior Year (Year 4)					
Semester 7		Crds	**Semester 8**		Crds
IS111IU	Capstone 1	3	**In case GPA <= 70**		
IS100IU	Decision Analytics	3	IS048IU	Thesis research	10
IS101IU	Industrial Process, System Data Analysis and	3	**In case GPA > 70**		
IS___IU	**ISE Elective Course (choose 2 courses below)**	**6**	IS094IU	Advanced Industrial and Supply Chain Systems	4
IS080IU	Creative Thinking	3	IS108IU	Capstone 2	6
IS035IU	Systems Engineering	3			
IS043IU	Flexible Manufacturing Systems	3			
IS045IU	Leadership	3			
IS082IU	Retail Management	3			
IS067IU	International Transportation &	3			
IS062IU	E-Logistics in Supply Chain Management	3			
IS066IU	Data Mining In Supply Chain	3			
____IU	**Free Elective Course (choose 1 course)**	**3**			
Total Credits		**18**	**Total Credits**		**10**

b) Intelligent Industrial Systems minor

Junior Year (Year 3)					
Semester 5		**Crds**	**Semester 6**		**Crds**
IS091IU	Management Information System with ERP Applications	3	IS079IU	Scientific Writing	2
IS025IU	Quality Management	3	IS028IU	Simulation Models	4
IS085IU	CAD/CAM/CNC	3	IS027IU	Scheduling & Sequencing	3
IS023IU	Inventory Management	3	IS041IU	Lean Production	3
IS104IU	Time Series & Forecasting Techniques	2	IS095IU	Industrial Intelligent Systems	3
IS092IU	Data Collection, Analysis, and Applications	3	IS096IU	Advanced Industrial Big Data Analytics	3
IS___IU	**ISE Elective Course (choose 1 course below)**	**3**			
IS031IU	Experimental Design	3			
IS106IU	E-Commerce Systems	3			
IS105IU	Cold Chain Systems	3			
Total Credits		**20**	**Total Credits**		**18**

IS053IU	Internship 2	3
Total Credits		**3**

Senior Year (Year 4)					
Semester 7		**Crds**	**Semester 8**		**Crds**
IS111IU	Capstone 1	3	**In case GPA <= 70**		
IS097IU	Smart Manufacturing Systems	3	IS048IU	Thesis research	10
IS098IU	Advanced Modeling & Protopying	3	**In case GPA > 70**		
IS___IU	**ISE Elective Course (choose 2 courses below)**	**6**	IS094IU	Advanced Industrial and Supply Chain Systems	4
IS080IU	Creative Thinking	3	IS108IU	Capstone 2	6
IS035IU	Systems Engineering	3			
IS043IU	Flexible Manufacturing Systems	3			
IS045IU	Leadership	3			
IS082IU	Retail Management	3			
IS067IU	International Transportation &	3			
IS062IU	E-Logistics in Supply Chain Management	3			
IS066IU	Data Mining In Supply Chain	3			
____IU	**Free Elective Course (choose 1 course)**	**3**			
Total Credits		**18**	**Total Credits**		**10**

c) Industrial Analytics minor

Junior Year (Year 3)					
Semester 5		**Crds**	**Semester 6**		**Crds**
IS091IU	Management Information System with ERP Applications	3	IS079IU	Scientific Writing	2
IS025IU	Quality Management	**3**	IS028IU	Simulation Models	4
IS085IU	CAD/CAM/CNC	3	IS027IU	Scheduling & Sequencing	3
IS023IU	Inventory Management	3	IS041IU	Lean Production	3
IS104IU	Time Series & Forecasting Techniques	**2**	IS093IU	Predictive data analytics and Applications	3
IS092IU	Data Collection, Analysis, and Applications	3	IS099IU	Industrial & Commercial Data Systems	3
IS___IU	**ISE Elective Course (choose 1 course below)**	**3**			
IS031IU	Experimental Design	3			
IS106IU	E-Commerce Systems	3			
IS105IU	Cold Chain Systems	3			

IS053IU	Internship 2	3
Total Credits		**3**

Senior Year (Year 4)					
Semester 7		**Crds**	**Semester 8**		**Crds**
IS111IU	Capstone 1	3	**In case GPA <= 70**		
IS100IU	Decision Analytics	3	IS048IU	Thesis research	10
IS101IU	Industrial Process, System Data Analysis and	3	**In case GPA > 70**		
IS___IU	**ISE Elective Course (choose 2 courses below)**	**6**	IS094IU	Advanced Industrial and Supply Chain Systems	4
IS080IU	Creative Thinking	3	IS108IU	Capstone 2	6
IS035IU	Systems Engineering	3			
IS043IU	Flexible Manufacturing Systems	3			
IS045IU	Leadership	3			
IS082IU	Retail Management	3			
IS067IU	International Transportation &	3			
IS062IU	E-Logistics in Supply Chain Management	3			
IS066IU	Data Mining In Supply Chain	3			
____IU	**Free Elective Course (choose 1 course)**	**3**			
Total Credits		**18**	**Total Credits**		**10**