ISEKI Food Association

Integrating Food Science and Engineering Knowledge Into the Food Chain

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Evaluation Report

Bachelor and the Master Degree in Food Science and Technology as well the international program version of the Master degree

Provided by

Kasetsart University, Bangkok

Version: 24 September 2018

Inhalt

1) Formal Data

Name of the degree programme (	Statistical Data ECTS/corrsponding Thai credits/duration of study/mode of study/level of the national qualification level	Labels applied for [1]	Intake ryhtm /first time to offer in current version
Bachelor in Food Science and Technology	286 ECTS/143 Ukrainian credits 8 semesters/full time/NQF level 6	EQAS Food Label	Twice a year/new program version as of 2016
Master in Food Science and Technology	120 ECTS/36 Ukrainian credits/4 semesters/full time/NQF level 7	EQAS Food Label	Twice a year/since 2017
International Master in Food Science and Technology	120 Credits/36 Ukrainian credits/4 semesters/full time Track A and Track B/NQF level 7	EQAS Food Label	Twice a year/since 2017
Date of the contract: 04.06.2018 **Submission of the final version of the self-assessment report:** 26.09.2018 **Date of the onsite visit:** 17-18.09.2018 **at:** Department of Food Science and Technology, Faculty of Agro-Industry, at Kasetsart University, Bangkok			
Peer panel: **Prof. Dr. Vasso Oreopoulou**, National Technical University of Greece, School of Chemical Engineering **Prof. Dr. Saverio Mannino**, University degli Studi di Milano **Dr. Mihaela Begea**, Senior Researcher, Polytechnic Universita of Bucharest **Oraphan Chucklin**, APAC RD Director, Pepsico Services Asia, Bangkok			

Darika Awapak, Thammasat University, Faculty of Science and Technology, Ph.D. Student
Representative of the ASIIN headquarter: Dr. Iring Wasser, Managing Director
Responsible decision-making committee: Accreditation Commission of IFA, Criteria Used: European Standard and Guidelines , 15.05.2015, IFA Accreditation Criteria

2) The rationale of the programs

2.1 Needs of Stakeholders

There are many educational offerings in the area of food science and technology in Thai higher education institutions. Today students can enroll in study programs at more than 70 universities in the country. As to Kasetsart University, its Faculty of Agriculture has offered study programs in the field since 1964, which makes it a pioneer in the field. It's Department of Food Science and Technology was established in the renamed Faculty of Agro-industry as of 1980.

The university convincingly argues that there is a considerable demand for graduates on the Bachelor as well as (to a lesser degree) on the Master level. This claim is justified by the fact that the food industry is the country's third largest industry and with more than 10,000 food and beverage processing factories operating in the sector. It accounts for almost one fourth of Thailand's Gross Domestic Product (GDP).

The program coordinators at Kasetsart university point to the fact that the demand of the market and consumers is subject to continuous changes together with an increase in the consumer's awareness of the importance of quality food, nutrition, and food safety. At the same time the global competition in the food sector is increasing, factors, which are contributing to the need to offer modern food science programs. Thailand´s current National Economic and Social Development Plan (year 2017-2021) also aims at strengthening the agricultural production capacity in the industrial chain.

In summary, there is a need for specialists in the field, which have a strong scientific knowledge and ability to respond to the needs of the agro-industrial sector. Thailand, according to the department, currently lacks these agro-industry specialists, which provides a rational to educate skillful and professional for food industry in all levels.

The expert team, after speaking to all stakeholder groups during the on-site visit, agrees, that there is a high demand for graduates on the Bachelor level and that job perspectives overall are good in the sector. As regards the national Master program however, the number of applicants and graduates is lower. In as far as the international Master program is concerned,

the graduation figures are exceedingly small with a one digit number of foreign students enrolling in the program every year.

There are a number of factors, which in the expert´s view must be attributed to this unfortunate development. On the one hand, a Bachelor qualification continues to be the standard entry qualification level to the Thai job market. In addition, Master graduates in comparison are not receiving a corresponding much higher salary on the entry level. Apart from these external factors, there are however also intrinsic problems regarding the profile and structure of the programs which are further specified in this report. The experts before this background recommend sharpening the profile **of the national Master program** in line with the specific research strength of the department instead of offering a "generalist" profile not being to a sufficient degree distinguishable from educational offerings at other institutions. **As to the international Master program**, they recommend reevaluating the existence of the program and either to invest in major recruitment efforts while modernizing it along the lines mentioned in this report or to stop offering it as the output does not justify the considerable investments made by Kasetsart University.

2.2 Educational Objectives and Program Objectives

The department according to its Self-Assessment Report has defined the following educational objectives and program learning outcomes for the three programs under review

For the Bachelor of Science program the following general learning outcomes:

- To provide strong academic foundation bachelor graduates who are able to integrate food science and technology knowledge and practicum experience for appropriate problem solving in their career
- To develop effective cognitive, communication, and interpersonal skills for lifelong learning and development
- To gain ethical and moral behavior, attitudes, and judgment

In addition, a number of specific food science program outcomes are cited. Accordingly, students graduating from Bachelor of Science Program in Food Science and Technology should be able to:

- Apply integrated knowledge (including food chemistry, microbiology, processing and engineering) to identify, analyze and solve problems in food science and technology.
- Describe and understand principal elements, chemical reactions and analytical techniques related to food properties before, during and post processing steps.
- Comprehend the characteristics and significance of beneficial, spoilage and pathogenic microorganisms in food and food industry; together with understand their application as starter cultures for food fermentation.

- Understand engineering theory, unit operations, food processing and innovation technologies and be able to apply the appropriate applications in food industry.
- Be able to apply and integrate principles of food science and technology to improve the safety and quality of food products that serves government policy and food industries; and conduct advanced research.
- Demonstrate professionalism and practical skills for food industry including communication skills, critical thinking, problem solving, life-long learning and organizational skills.

As to the two Master programs under review, the department aims to educate graduates in Food Science who are able to demonstrate an academic leadership in the higher education level and are able to effectively solve problems concerning Food Science and Technology. In addition, they should be able to create research output with practical applications. Furthermore, graduates should dispose of the knowledge, ability, morality and professional ethics to serve the society and the nation to flourish.

With regard to the specific program learning outcomes, the national as well as international version of the Master of Science Program in Food Science focuses on producing Master graduates who

- Understand and apply fundamental in food microbiology, food toxicology and safety management.
- Analyze and evaluate the causation of food-borne infection, shelf-life and safety of foods. Design experimental concept of predictive modelling to produce safe foods.
- Are able to critically compare the difference of structure, function and interactions of major and minor food components affecting on the physical and chemical properties of foods
- Justify and check the changes on physic-chemical properties of foods affected by food process operation.
- Design food and ingredient functionalities using the right understanding of analysis methods, chemical composition, physical properties, nutritional and sensory characteristics of foods
- Understand and choose appropriate processing lines and technology for industrial scale food production among traditional and emerging food processing technologies regarding their effects on food complex formation, quality and safety.
- Differentiate and apply the food quality and safety management legislation and related standards in national and international levels.
- Evaluate cause of foodborne outbreak and hygienic problems and select appropriate methods and systems of food quality and safety management for production of safe foods.

- Understand the principle of good laboratory practices, laboratory skills, experimental design and the statistical tools.
- Design the experimental plans and conduct the research project under supervision of thesis advisor
- Generate and communicate the scientific ideas through written report and oral presentation with the discussion of these ideas at a higher level in English.

It is important to note (see below), that the learning outcomes for the national and international Master program are identical.

In the expert´s opinion, the formulation of the learning outcomes **for the Bachelor programs** are well done. They also confirm alignment with the learning outcomes of the EQAS food label on the Bachelor level.

For the two Master programs under review, the analysis is more complex.

The experts understand that there are different paths to reach a Master qualification in the department. On the one hand, there is a "track A1", which is the "non-course" enrollment track, in which students are not taking any additional course work apart from their master thesis (with the exception of 2 credits compulsory non-credit courses). On the one hand, there exists a "track A 2", in the framework of which students are choosing a certain number of elective courses (18 credits) in addition to writing their muster thesis.

It is vital to note, that for the international master programs, students can only choose track A1. As a consequence, they are effectively banned from taking any courses/modules in or outside of the department. The program coordinators explain that this is due to two factors: on related to the fact that international students are studying on a two-year stipend and that this duration would be too short to enroll in the track A 2, where the standard period of study is around three instead of the two years. In addition, all electives are exclusively offered in Thai language, so that the international students in the English speaking international Master program have no possibility to attend any additional courses.

According to the experts opinion, there is a need to explain, how equivalent learning outcomes of the Master programs under review can be attained by different batches of students, one enrolled in the Thai national program essentially following the track A 2, and the International Master program, following the track A1. The experts do not see how the international students can reach the attainment of the learning outcomes as they are practically prohibited to attain the learning outcomes necessary for a Master qualification.

As regards the national version of the Master program, the peers are more optimistic, that the learning outcomes formulated by the department (and thus the attainment of the EQAS food label Learning Outcomes) can be achieved. For this to materialize, however, it is necessary in the expert´s eyes that on the one hand learning outcomes for the thesis are

formulated (this thus far is absent in the course handbook). For the Thai students in the track A2 on the other hand, the Selection Committee of the department is challenged to define very clearly what combination of electives are suitable to reach the defined learning outcomes for each graduate instead of leaving this choice up to them.

3) Educational Process

3.1 Overview and delivery of the curriculum

The Structure of the Bachelor curriculum according to the Self-Assessment Report is as follows: Undergraduates study the fundamentals of food chemistry and analysis, microbiology, processing and engineering, with an emphasis on food innovation, safety and quality. Senior students opt for specialized courses such as Post Harvest Technology, Fishery Products Technology, Technology of Edible Fats and Oils, Dairy Product Technology, Fruit and Vegetable Technology, Bakery Technology, Confectionery Technology, Freezing Technology in Foods, and Hazard Analysis and Critical Control Points. The total credit house of the program is 143 (286 ECTS) including general courses (included English communications) not less than 36 credits (72 ECTS), background courses 41 credits (82 ECTS), compulsory courses 62 credits (124 ECTS), and optional courses 4 credits (8 ECTS). The last year is devoted to two capstone design courses, called practicum I and II. Industrial practice of at least 200 hours are required. The rules and regulations for the industrial training of undergraduate student established by the Faculty of Agro-Industry apply. The second course: Practicum II is organized as a project based inhouse study with 100 hours of practice.

As regards the Bachelor Program, the experts think that overall the structure of the curriculum is suitable to reach the defined learning outcomes. They nevertheless see a necessity to improve the logical sequence of the course structure. Accordingly, they recommend reviewing the positioning of food science courses such "food nutrition", "ingredients and food additives", as they are taught without that the necessary knowledge foundation has been laid in areas such as biochemistry and principles in food chemistry. They also see a need to adjust the calculation of the ECTS credits (currently the conversion rate is 1:1,7 on the Bachelor level) along the European "currency" according to which 25-30 hours of student workload equals 1 ECT point).

The two-year national Thai Master study program is a research-oriented programs emphasizing various aspects in the field of Food Science and Technology. It includes courses in Food Chemistry, Food Analysis, Food Microbiology and Food Safety, Food Quality, Post-Harvest, Technology, Fishery Products Technology, Technology of Edible Fats and Oils, Dairy Product Technology, Fruit and Vegetable Technology, Bakery Technology, Confectionery Technology as well as Freezing Technology in Foods.

Thai students study in the A2 tack: the total credit hours of the program are 36 credits (120.24 ECTS) including compulsory courses 7 credits (23.38 ECTS), elective courses amounting to 11 Ukrainian credits (36.74 ECTS), and thesis 18 credits (60.12 ECTS).

Regarding the National Master Course, the peers learn that the standard period of study is regularly exceeded by 2 semester and before that background ask the program coordinators to institutionalize adequate instruments to avoid this delay.

For the International Master program, the students in the A1 track are focusing almost exclusively on their thesis. The total credit hours of the program are 36 credits (120.24 ECTS1) including 2 credits (6.68 ECTS) of compulsory as non-credit courses and the thesis worth 36 credits (120.24 ECTS)

The experts question the suitability of this structure and doubt that equivalent qualification levels can be reached as compared to the Thai Master program version. **As to the issue of attaching ECTS credits,** the experts ask to recalculate the distribution of credits in line with the requirements of the European ECTS system. In this system, one credit point is attached to 25-30 hours of student work.

3.2. Learning and Assessment

The review team takes note of the fact that currently no general universities policy concerning course assessment methods is in place. The employed assessment methods based on student centered learning are chosen by each lecturer individually and are announced to students during the 1st courses at the beginning of each semester. Katsetsart University claims that it encourages outcome-based assessment on all levels. As exemplified by the module handbook, there is indeed a broad range of assessment tools including written and oral examinations, group projects, case studies, role plays, game based activities and field trips.

The experts after the discussions with stakeholder conclude that there are very good examples for an outcome based assessment system in place and that in some study groups professors are discussing the issue together. They nevertheless recommend thinking about a more homogeneous approach across the entire department. In addition, they see room for improvement as regards the use of outcome based rubrics in the examination system and also recommend to look into the potential benefits of using external examiners as a control device.

Finally, in their discussions with stakeholders, the need to enhance “critical thinking skills” among students in the department on all levels is very clearly voiced..

3.3 Alignment matrix for EQAS

The department of food science and technology has presented an extensive mapping of the required learning outcomes defined by the International Food Association as prerequisite for obtaining the EQAS Food quality seal for all three programs under view (while taking into account that the learning outcomes for the national and international version of the Master program are identical).

The experts acknowledge that the course handbook is well written and that the modules dispose of well-written learning outcomes, using Blooms taxonomy as an instrument. All essential information is contained. The peers before this background have only few suggestions for improving/correcting the document: The module "Introductory Food Science and Technology" is cited as a compulsory module, although it is optional as indicated on page 9 of the curriculum outline. They experts furthermore recommend listing the modules in the following order first the compulsory courses and then the electives in line with the SAR. Moreover, they suggest clarifying the language being used in the teaching modules. "Principles of Chemical and Physical analysis for Food" (2nd semester, 3rd year), "Principles of Food Processing" as well as "Food Standards and Regulations" and "Principles of Food Microbiology" (each 1st semester 3rd year are all listed as being taught in Thai or English, whereas in reality all these modules are taught in the national Thai language. The same applies to "Applications of Instruments for Quality Control and Food Safety", "Research Techniques" (1st Semester 4th year), "Fruit and Vegetable Technology" as well as "Confectionary Technology and Non-Alcoholic Beverage Technology" (2nd. Semester 4th year) and "Current Issues in Food Science and Technology".

As already mentioned under Section 2.2 of this report, the experts attest alignment of learning outcomes for the Bachelor program with the EQAS food requirements. As to the Master level, the mentioned changes for the A1 as well as A2 need to be effectuated, before alignment can be confirmed.

4) Resources and Partnerships

4.1 Academic and Support staff

According to the Self-Assessment Report, there are altogether 29 academic staff in the department of Food Science and Technology. All of them are holding a Ph.D. degree as academic qualification. Due to specification of the Thai educational system, there are currently no full professors teaching in the department, but 5 associate professors are currently on track to reach this status in the near future.

Given the number of enrolled students, there is currently a student-staff ratio of around 1:18. The age structure currently is a challenge, as next year alone, 7 of the teaching staff are

reaching retirement age. A majority of the lecturers are engaged in a considerable number of research and professional activities.

Students during the interviews voiced high satisfaction with the quality of their teaching staff. Supporting evidence to that regard can be found in the evaluation surveys where the quality of staff with few exceptions is consistently rated high.

When interviewed, the teaching staff overall rated their working environment and the possibilities for continuous education as good in spite of the fact that they wish a better balance between teaching, research and administrative responsibilities. The latter in their view could be better taken care of by administrative support staff, which is currently lacking in sufficient number in the department (see below).

As to the category of **support staff**, there are currently 13 staff members employed by the department of food science and technology, including 4 administrative officer, 2 teaching assistants in all food chemistry laboratory courses, one teaching assistant and two technicians in all food processing/engineering laboratories, one assistant for the food microbiology laboratory course as well as three general staff.

The experts see room for improvement but understand that currently it is difficult to recruit qualified laboratory assistants in sufficient number. According to the department, this is due to the fact, that in spite of available resources they have difficulties in competing with industry in hiring the most qualified staff. The review team nevertheless is of the opinion that the academic resources available for the delivery of the three programs under review are suitable and of good quality.

4.2 Facilities

Classroom teaching at Kasetsart University relies on modern equipment for teaching in all areas. The Self-Assessment Reports list in detail all the available material for areas such as food chemistry and analysis, food safety and microbiology and physical properties.

The Department of Food Science and Technology operates the following teaching facilities on campus: an undergraduate teaching laboratory in food chemistry and analysis, one for food microbiology experiments, a sensory evaluation room, a food preparation room, as well as a pilot plant hall with an extra space for twin screw extruder and a bakery facility. These labs are designed for students in their first three years of enrollment whereas undergraduate students in their final year execute their capstone projects in more dedicated research laboratories and in a pilot scale food processing Hall III. The Food processing plant consists of 4 entities, pilot plant hall I and II, a meat and a bakery room and is sufficiently equipped to do advanced research.

There is enough capacity to do experiments as students of each academic year at the outset are divided in 3 groups of around 40 students each. Students are familiarized with all laboratory safety requirements during the first lab lesson and have to demonstrate their understanding by passing a corresponding quiz.

The students voice overall satisfaction with the quantity and quality of the equipment. They at the same time would however appreciate a less bureaucratic approach to register for the laboratories (online registration). In the discussion with staff members the experts learn, that that requests for equipment and supply usually are quickly honored and that the material base for teaching and research is considered sufficient.

As to the **library**, the KU main library serves as the national center of Thailand for the AGRIS and CARIS (the international information system for agricultural science and technology of the United Nations Food and Agriculture Organization) and for IBIC. It is also a national coordinating center for agricultural information resources management under the National Information System of Thailand since 1980. All student and faculty member can access relevant databases for related food science and technology, e.g. the ACS, SpringerLink, ISI Web of Science etc.. Overall satisfaction with the library facilities is high.

Computer and Internet Access is of good quality. Students and faculty members can use computer laptops connected with high-speed internet at the Faculty of Agro-Industry computer centers. The high-speed Kasetsart University Wireless Network and the Virtual Private Network are available for KU students, faculty and staff.

The peers rate the available infrastructure as suitable to obtain the learning outcomes of all three programs under review. All of the aforementioned labs according to the expert´s opinion are well equipped and are suitable to obtain the program learning outcomes. Some analytical equipment are high end (e.g. Gas Chromatography with Mass detector).

4.3 Partnership

The department of food science and technology entertains partnerships with local research institutes, government authorities, local and oversea industries, other Thai and international universities. According to the Self-Assessment Report, staff from local research institutes, government authorities are invited to be guest lectures, or members to research committee and external committee monitoring thesis defense exams. Local industries and oversea industries at times also provide research topics and research funding for graduate student in the program.

There are a variety of instruments in place at the department of food science and technology to acquaint students with the exigencies of modern Thai work life as well as preparing them for research activities.

Internships: In the course of their studies, students are required to participate in two different internships. Junior students in their second year undertake an internship (the so-called Practicum I) at local and international food industries. In the practicum II at the end of their studies, students spent another 100 hours in industry to develop their interpersonal and leadership skills. Alumni and food companies support the execution of practicum II in demand for training and raw material. In addition, the alumni association acts as a coordinator for additional internship programs for 1st -4th year students.

The peers acknowledge the fact that the department since the last program revision for the Bachelor program in 2016 has made the two practicums compulsory instead of voluntary components of the curriculum. At the same time, they recommend considering a longer exposure for the internship program (in excess of the current 200 hours or 5 weeks).

There are **two courses in research techniques** I and II which work in close collaboration with food industries and FDA. Faculty members engage as trainers for food industry, and offer shorts courses to food industry and public in various areas. Outstanding alumni and industrial representatives are regularly invited as speakers for 4th year students during their final orientation. Student annually participated in a quiz completion of food science and technology subject organized by FoSTAT and international companies (e.g. Nestle).

The peers commend the faculty for its attempts to integrate teaching and research in the delivery of the program.

As regards the transition from study to working life, the peers see room for improvement in the quest to better familiarize graduates with the exigencies of the labor market. They acknowledge the existence of instruments such as an industrial job fair, taking place in the premises of the university, but at the same time recommend establishing a career service center to assist student in the transition process.

The Self-Assessment-Reports also cite a considerable number of **international partnerships** with universities such as the University of Natural Resources and Life Sciences (Austria), AgroSup Dijon (France), Cornell University (USA), National University of Singapore, Wageningen University (the Netherlands), Hohenheim University (Germany), University of Putra Malaysia (Malaysia), Bogor University (Indonesia), Sejong University (Korea), Kyoto University (Japan), National Pingtung University of Science and Technology, Taiwan. The department of Food Science and Technology informs the expert group, that it is furthermore in the process to establish double degree programs on the master level with leading universities in Asia (University of Putra Malaysia, Malaysia, Bogor University (IPB), Indonesia, Kyoto University, Japan, National Pingtung University of Science and Technology (NPUST), Taiwan.

In the course of the interviews however, it turns out that not too many students in the three programs under review dispose of an international study experience. In the past two years,

only around 10-15 students have studied abroad, one of the impeding problem being the considerable amount of tuition fees to be paid.

The experts encourage the department to intensify its effort for internationalization of the programs under review but also point to the fact that in order for this to materialize, support measures such as intensified English language training, formalized learning agreement, alignment of learning outcomes and credit point systems and so forth are warranted.

5) Management System

All academic curricula at KU are reviewed every 5 years, a small scale review takes places each year in addition. In case of the three study programs under review this has occurred last time in 2016 for the Bachelor, and 2017 for the two Master programs. In this process the feedback from student surveys, feedback from alumni and employers as well as the results of exit examination were considered.

Students In the department are required to do the class evaluation twice a semester via university's on-line system, i.e. after midterm exam and at the end of each semester. There is a 100% response rate as students do not have access to their grades if they don´t fill out the questionnaires. Each instructor is required to log in to review students' evaluation results and comments in order to respond and improve his/her class accordingly. At the end of semester, after the final grades have been announced, instructors must submit an action plan related to students' evaluation results or comments. The faculty members responsible for curriculum management then analyze and summarize the results in a comprehensive report.

Employers are invited to share their opinion and give feedbacks concerning the quality and performance of the degree graduates annually. Their responses are compiled and analyzed by faculty members responsible for curriculum management. The results are discussed among faculty members for further improvement of curricula, course content, skill sets required, and proposed activities in order to reflect employers' requirement. Additionally, employers of Master degree graduates are interviewed to give feedbacks of the graduate employees in the context of 5 major learning outcomes according to Thai Qualifications Framework for Higher Education.

As mentioned above, quality management of the programs is administered by 5 lecturers specifically assigned for the Bachelor and Master programs. They are assisted by the comments from academic staff, students, graduates, alumni, employers and independent assessor to improve the study program and to increase the quality of graduates.

The experts commend the department for its quality assurance arrangements. At the same time, they encourage the faculty to close the feedback channels. Good practice requires that feedback is reported back to various stakeholder groups to which extent their comments were taking into account.

They furthermore recommend establishing a formal department-industry advisory group to have more consistent communication patters. As regards student feedback, the peers suggest to use more the instrument of student focus groups in addition to regular questionnaires as a suitable means to learn what students need.

6) Supporting Information about the Study Programs

Bachelor Programs in Food Science and Technology have been offered ever since 1964, the Master program in Food Science was established in 1969 and the program has been continuously active ever since. As to the International Master program, it came into existence in the year 2010.

As to current enrollment figures: for the Bachelor program, around 125 Students are enrolled per year, around 500 per batch. Bachelor students have to pay around 420 EUR tuition fee per semester. For the (national Thai) Master program, the corresponding figures amount to around 20 students per semester. The international Master programs welcomes only around 2-3 individual candidates, all of which are doing the non-credit, thesis only version. Apart from graduating from a food science and technology Bachelor or related field, they also have to fulfill additional admission requirements (e.g. submit a proposal for a research project). The tuition fee in the international Master program amounts to 870-950 EUR, depending on the semester, the students are enrolled in.

The calculation of ECTS is been done differently for the Bachelor and Master programs, whereas in the former 143 Thai Credits equal 286 ECTS, whereas in the Master programs it is 36 Thai Credits equaling 120,24 ECTS.

6.1 Changes to program

As regards the development of the Bachelor program, a number of important changes have been institutionalized in 2016 based on the feedback of stakeholder. A major change constituted the prolongation of the final research project. A second course on research techniques (research techniques II) was added to the current program to that effect. Now there are two consecutive capstone courses, which have been implemented for 4th year students as of 2014. In addition, research laboratories are in the process of being renovated.

Additionally, a certain number of adaptations in the course structure have been effectuated: The course in “General Physical Chemistry” has been replaced by Fundamental Physical Chemistry in Food” to better understand the correlation between physical chemistry and food science. Moreover, the course “Current Issues in Food Science and Technology” now is offered to improve the abilities of students for applying and integrating the principles of food science in real life situations. More guest lecturers have been invited to teach courses such as

principles of food processing, food quality assurance and food plant design. An additional seminar featuring speakers from industry and the international university has been added.

In their quest to improve English language skills, the department has chosen the following instruments according to the SAR:

First, at least one departmental course in English is offered per semester. Second, a policy is said to be in place linking Thai students with international exchange students. Exchange programs with Hiroshima University (Japan), University of California, Davis, and the University of Reading (UK) are in place, two more exchange programs with Bogor Agricultural University (Indonesia) and Universiti Putra Malayisa) in preparation, though the number of exchange students is very low.

Finally, the concept of a multidisciplinary curriculum has been introduced. Now student are also required to take social science and humanities classes such as "Introduction of Economics", Modern Entrepreneur or "Psychology for Modern Life" and "Arts of Living"

The experts take note of the curricular adaptions cited above with the following comments: They recommend institutionalized Learning Agreement in order to facilitate automatic recognition of credits and to Increase the number of students profiting form an international study experience. They also insist that the use of English as a teaching language must be expanded in order to equip students with the necessary language skills in a globalized economy. Also, the efforts to create a better learning atmosphere for international students must be high priority, as international students during the interviews complained about isolation and were looking for more interactive learning formats with Thai students.

6.2. Performance

The department disposes of a number of tools to assess achieved program outcomes. Fourth year students are being exposed to exit examinations in areas such as food chemistry, food microbiology, food processing, food standards and regulations and English language. The overall results from the last 6 years according to the SAR indicate that the 4th year student performances were satisfactory in all areas. The expert also requested to check the quality of Master theses and some course work, but in effect could only check the outcome of one individual Master thesis written in English.

Post-graduation surveys are distributed to ask graduates about their future expectations and chances on the labor market. The results reveal that all students, who do not want to continue their education, get a full time employment within one year after graduation. Only around 15 percent continue their education. The department however lacks more precise information about individual career paths, the quality of the employment, salary levels etc..

The peers recommend before this background devising more suitable survey instruments to analyze with more precision the degree to which graduates succeed in the job market.

As regards r**esults from External Accreditations,** the Institute of Food Technologists (IFT) and the International Union of Food Science and Technology (IUFoST) have accredited the Bachelor program under review in 2014. The Master programs just have been accredited from 2017-2022.