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COMMON FRAMEWORK REPORT FOR THE ESTABLISHMENT OF FOODI CENTERS OF EXCELLENCE

WP 3: ACADEMIC STAFF TRAINING AND PREPARATION FOR DELIVERY

foodi
ERASMUS+ CBHE

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1 The Project

FOODI Master’s Degree (MSc) Programme in Food Processing and Innovation

The FOODI consortium is a strong and mature partnership of Asian and EU academic institutions, most of whom are listed in the prestigious World University Rankings by Times Higher Education.

It consists of 16 organizations from 3 EU countries and 4 Asian countries. The 10 HEI from partner countries (PCs) comes from 3 different countries in Asia (Malaysia, Cambodia, and Thailand). Food-industry plays a key role in economic and social development, thus covering a large part of the region of Asia. All EU and PC HEI are specialized in Food science and technology.

FOODI will impact academic professionals and administrative staff working in the PC HEIs and other HEIs by establishing FOODI centres. It is anticipated to act as foci for research and innovation in the area thus ensuring that Food Processing & Innovation will remain high in the regional priorities agenda academically but also in terms of policy, for a long time after the project has been completed. Academic professionals and administrative staff from partners’ HEIs will continue to benefit from them, but research gains will spill over to the inter-regional and global academic community thus benefiting other stakeholders as well such as researchers, experts, associations, or networks of HEIs, research institutes and industry actors.

FOODI will have a significant long-term impact on students at a local, regional, national levels after the project since the programme will continue being delivered and increase its students’ intakes in the years after the project. The same goes for the accompanying internship programme that students will be expected to complete thus gaining valuable on the job working experience. The long-term impact of FOODI on students could be exponential if the MSc programme in its entirety or at least some of its components (MSc, VET) are adopted by other HEIs nationally or in other countries in the region that face a similar gap in the subject area such as Bangladesh and Indonesia.

Finally, the FOODI will impact the industry through the continuation, expansion and growth of the internship programme and the VET courses being delivered. FOODI initial success will mean that more companies will join the programme after the project by offering internship placements or training their personnel.

1.1 The Graduate Course: MSc Food Processing and Innovation

The FOODI MSc Programme contains 90 credits, delivered over three semesters, with 72 core and 18 elective credits. The programme includes both technical (engineering, science, nutrition, health) and business (entrepreneurial/intrapreneurial, innovation, business strategy) aspects. The core of the programme is the MIDAS course with an allocation of 30 credits. MIDAS is an acronym for ‘Mastering Innovative and Disruptive Approaches for Success’ which aims to foster creative confidence as well as an innovative and entrepreneurial mindset in the students and includes an industry linked Action Research Project culminating in a presentation of the projects at a FOODI Conference with the host industries. Flexibility is afforded in a choice of three elective courses, each carrying the standard 6 credits. The pedagogical approach will be rooted in active learning and encapsulates a challenging, innovative, and creative environment.

1.2 Programme Vision and Values

Graduates of the FOODI MSc Programme in Food Processing and Innovation demonstrate advanced knowledge and skills in the interdisciplinary field of food science and technology and possess a strong technical capability enabling them to contribute to the transformation of the food industry through a creative, innovative, and professional approach.

The programme exposes students to a range of core and elective courses enabling them to critically analyse, synthesize, evaluate, and interpret information pertaining to the food business sector, to develop a creative and innovative mindset and to act and communicate in a professional and ethical manner, ultimately leading developments and resolving challenges in the food sector.

The learning takes place in a transnational, diverse, adaptive, and innovative blended learning environment using a variety of methodologies and tools including traditional classroom lectures, laboratory work, field trips, case studies and simulations, team-based learning and project work, self-directed and autonomous learning, workshops, seminars, professional industry internships as well as webinars and on-line tutorials. It engages with the FOODI Centres of Excellence for vocational training courses and with digital learning (MOOCs).

Key enablers of student learning are academia-industry collaboration, diverse learning, critical thinking, projects, presentations, design thinking and prototype development, teamwork, collaboration, discourse and debate, group-based project learning, assignments, mentorship, case studies aligned to regional challenges but with a national and international context.

1.3 Programme Outcomes

Graduates of the programme can:

- Integrate knowledge of food science/technology/entrepreneurship principles for transformation of the food industry to produce quality, safe, sustainable, and healthy food.
- Critically evaluate and apply innovative technologies for positive disruption and development of the food industry.
- Conduct research and adhere to legal, ethical, and professional practices in food innovation.
- Demonstrate the ability to perform and effectively communicate original research in interdisciplinary areas of food science, technology, and entrepreneurship.
- Implement standard analytical and innovative methods including digital technologies, statistical software to monitor the risks and hazards influencing food quality.
- Demonstrate responsibility in planning, resource management, supervision, problem solving and managing work within a team and collaboratively with other teams.
- Analyse the main economic and strategic issues concerning food markets and consumer preferences, creating effective marketing plans for the food industry.
- Plan or lead an entrepreneurial venture/ “start-up” or apply intrapreneurial intervention in the food domain.

2 Foodi Center of Excellence

2.1 Background

Foodi Center of Excellence (Foodi Centers) are conceived to act as foci for research and innovation in the area of food science and technology, thus ensuring that Food Processing & Innovation will remain high in the regional priorities agenda academically but also in terms of policy, for a long time after the project has been completed. Academic professionals and administrative staff from partners' HEIs will continue to benefit from them, but research gains will spill over to the inter-regional and global academic community thus benefiting other stakeholders as well such as researchers, experts, associations, or networks of HEIs, research institutes and industry actors. According to the project proposal, establishment of a “FOODI Center of Excellence” in each partner institution is essential to run MSc programmes and vocational training courses on “Food processing and Innovation”. Since this is a graduate program with many experiments to be performed, a laboratory needs to be set up with necessary equipment. The acquired equipment will be installed in these laboratories ready to be used for the delivery of the programme in WP4 and for research and networking purposes during and after the project. Each Asian partner university will allocate a separate room to host the project which will serve as a secretariat of " FOODI Center of Excellence (FOODI centers)".

Depending upon the process or requirement, each institution can propose opening up of the laboratory following their respective regulations. They will have a visible signboard with project logo (to be designed later), a dedicated secretary, and preferably own several classrooms or access to them, suitable for organizing training and MSc courses. Local Coordinator serves as the Director/Coordinator of the laboratory approved by the concerned authorities.

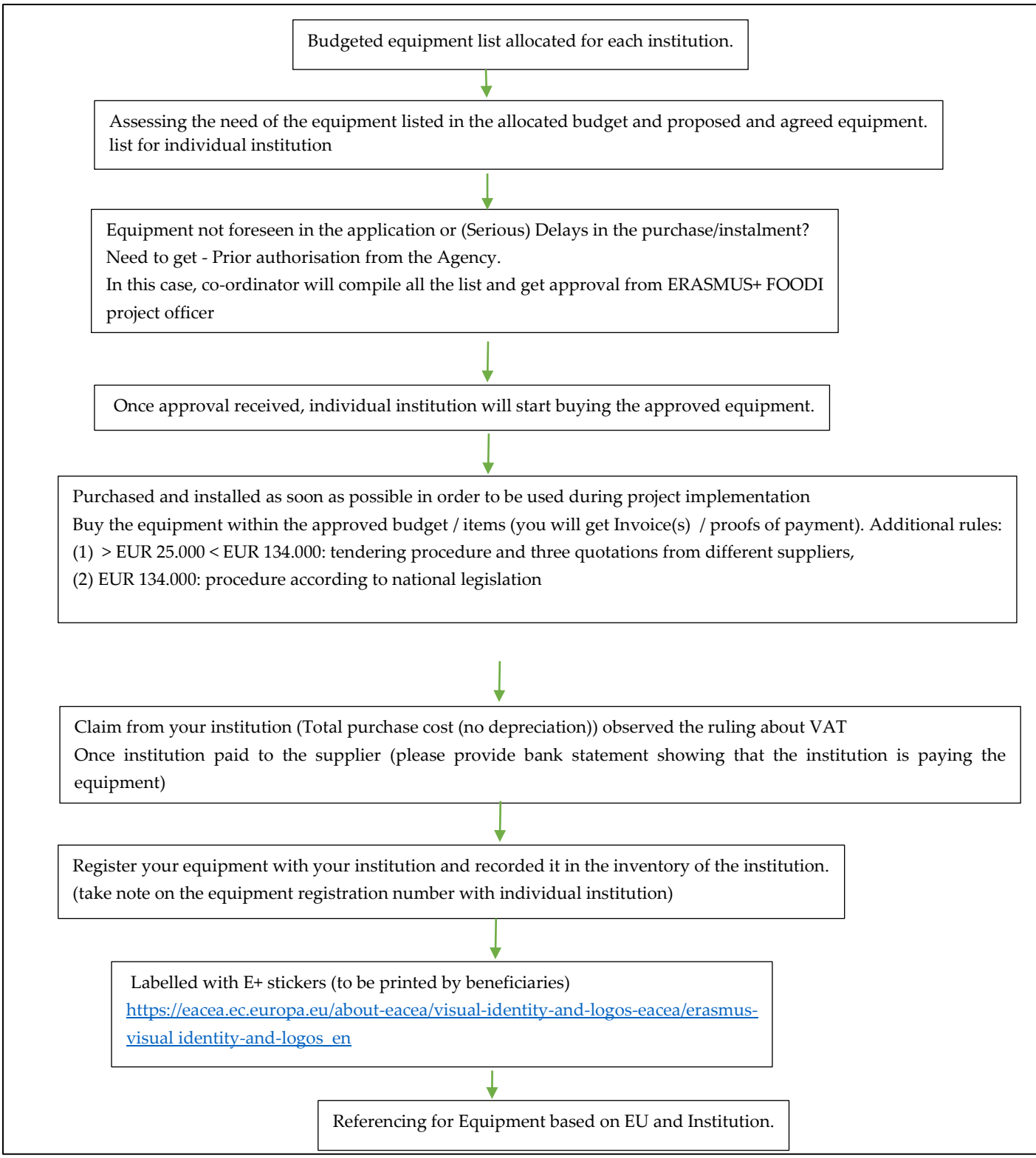
The “FOODI Center of Excellence (FOODI centers)” will develop and share the best practices by focusing their efforts on these main activity areas.

- Evaluate and communicate best practices in innovative food processing, their quality and food safety and contribute towards the sustainable development goals (SDG 2, 3, 11, etc).
- Strengthen technical capacity and develop graduates with excellent analytical skills.
- Educate and Improve food safety and food quality workforce – both government and private sector including retail sector, especially on food safety and quality standards, food policies and regulatory frameworks, risk communication and certification systems.
- A world-leading informed and engaged agri-food sector in each partner institute.

Overall objectives of this center will be but not limited to:

- Undertake projects and “State-of-Art Technology” transfer to the food industries.
- Conduct training programme for upgradation of skills.
- Gateway to state-of-the-art research labs and pilot plants based on green biotechnological and nanotechnology innovations/ creation of patents for food processing.
- Increase collaborations with the national and international academic and research institutes, regulation bodies and industries.

2.2 Equipment workflow for Foodi Center of Excellence


Budgeted equipment list allocated for each institution.
Assessing the need of the equipment listed in the allocated budget and proposed and agreed equipment. list for individual institution
Equipment not foreseen in the application or (Serious) Delays in the purchase/instalment? Need to get - Prior authorisation from the Agency.
In this case, co-ordinator will compile all the list and get approval from ERASMUS+ FOODI project officer
Once approval received, individual institution will start buying the approved equipment.
Purchased and installed as soon as possible in order to be used during project implementation
Buy the equipment within the approved budget / items (you will get Invoice(s) / proofs of payment). Additional rules:
(1) > EUR 25.000 < EUR 134.000: tendering procedure and three quotations from different suppliers,
(2) EUR 134.000: procedure according to national legislation
Claim from your institution (Total purchase cost (no depreciation)) observed the ruling about VAT
Once institution paid to the supplier (please provide bank statement showing that the institution is paying the equipment)
Register your equipment with your institution and recorded it in the inventory of the institution. (take note on the equipment registration number with individual institution)
Labelled with E+ stickers (to be printed by beneficiaries)
https://eacea.ec.europa.eu/about-eacea/visual-identity-and-logos-eacea/erasmus-visual identity-and-logos_en
Referencing for Equipment based on EU and Institution.

2.3 HEI’s receiving equipment cost for FOODI Centers

Total Allocated Budget For Procurement of Equipment -140000 Euro				
PN	University/Institution	Country	Allocated Budget	Planned List of Equipment for Foodi Centers
1	Universiti Teknologi Malaysia	Malaysia	14000	Equipment for the FOODI Center of Excellence: Temperature measurements (Therocouples +Data aquisition+Data Loggers) 1.500,00 Thermohydrometry devices + data acquisition + data loggers + labview software 1.500,00 Food quality control experimental devices 2.000,00 LabVIEW software portfolio 2.000,00 Protein Analyzer / Food Protein Analysis (mass spectrometry) 2.000,00 Sima-pro for analysing and monitoring the sustainability perfomance of food production systems 5.000,00
2	University of Malaya	Malaysia	14000	
3	Universiti Teknologi Mara	Malaysia	14000	
4	Universiti Kuala Lumpur	Malaysia	14000	
5	University of Heng Samrin Thbongkhmum	Cambodia	14000	
6	University of Battambang	Cambodia	14000	
7	Svay Reing University	Cambodia	14000	
8	Institute of Technology of Cambodia	Cambodia	14000	
10	Asian Institute of Technology	Thailand	14000	
11	Prince of Songkla University	Thailand	14000	

3 Universiti Teknologi Malaysia (P1-UTM)

MSc FOODI in UTM is the first transdiciplinary academic programme in UTM. Since it combines the discipline of Food Science, business and design thinking, it becomes a co-ownership program between two faculties, namely Azman Hashim International Business School and Faculty of Chemical and Energy Engineering.

One set of the equipment's is installed at the Food and Biomaterial Engineering Lab (FoBERG), Block N29, School of Chemical and Energy Engineering, UTM Skudai, Johor Bahru. The second set was installed at UTM Kuala Lumpur Campus. The FoBERG laboratory is managed and supervised by the head of the lab, Prof Dr Ida Idayu Muhamad, who is responsible for ensuring the maintenance and regular inspection of laboratory equipment. Dr Era Ricar Salleh and Dr Norhayati Pa'e assisted the head of the laboratory. For the Kuala Lumpur campus, the suitable placement of all the equipment is in the Laboratory Centre, UTM Kuala Lumpur.

By having two locations of the FOODI Centre of Excellence Lab, students and researchers could perform research and class activities without travelling as Kuala Lumpur and Johor Bahru are more than 300 kilometres away from each other. The lab head placed the Erasmus CBHE Logo and the Project (FOODI) logo on the equipments and laboratories. The following pictures depict the FOODI Centre Lab of Excellence also known as The FOODI Lab in UTM.

Figure 1 The Bench Top Sterilizer at UTM FOODI Lab.

Figure 2 A Lab Assistant testing the Continuous Sealing Machine at UTM FOODI Lab before students using it for their Food Packaging course of MSc FOODI

Figure 3 Lecturers/researchers as well as the Lab Assistants of UTM were arranging equipment during the establishment of their FOODI Lab Centre of Excellence

Azman Hashim International Business School and Faculty of Engineering has appointed and Dr Maizaitulaidawati Md Husin and Dr Era Ricar Salleh as FOODI coordinator. They are involved with teaching for MSc Foodi, responsible for allocating teaching workloads to all MSc Foodi lecturers and managing FOODI administrative tasks, including class allocation and student affairs with the help of faculties associate.

4 University of Malaya (P2-UM)

Universiti Malaya is allotted Euro 14000 for the purchase of equipments. The list of equipment approved is 1) Interface 1010E Potentiostat/Galvanostat/ZRA, 2) Quintix Semi-Micro Balance and 3) Stainless Steel Grade 304 Autoclave (2 pieces). These are very much importance in testing of the food related materials.

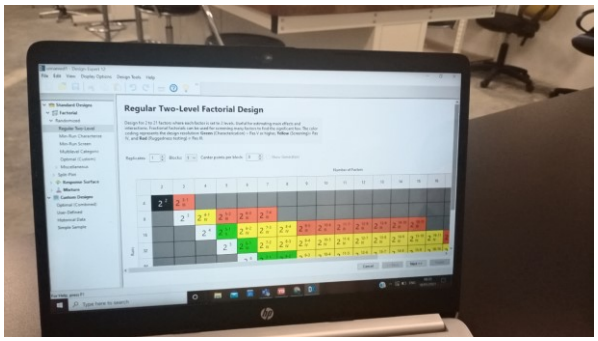
Equipment Workflow for Foodi Center for Excellence

After the approval for the purchase of the equipment list, we have opened the tender in our eprocurement system. Three quotations were obtained and market survey comparison prepared. These were posted in portal and the tenders were obtained. The more suitable company has been selected to deliver the equipment. These equipments have been kept in our lab. These are being used to characterize the materials analyse their properties.

Prof. Dr. Ramesh T Subramaniam will act as the head of the lab and Assoc. Prof. Dr. Ramesh Kasi will be the secretary for the lab..

5 Universiti Teknology Mara (P3-UiTM)

A dedicated laboratory for the program is parked under the Faculty of Applied Sciences, University Teknologi MARA Sarawak Branch. However, not all instruments are placed in this laboratory. Autoclave and Sealer machine are kept in existing Food Technology Laboratory as they require a place with specific requirement. In addition, the Design Expert Software is installed via email link and registered under the name of one of the FOODI lecturers.

No	Photo of Instrument	Remarks
1	 Design Expert 12(DX) Software	The software is installed through downloading via email link. It is registered under one of the FOODI lectures.

2	 Autoclave (For Retort)	The installation is still pending as the vendor could not travel down to the campus due to nationwide movement control order due to Covid19 pandemic.
3	 Vertical sealer	
4	 Pasteurization Machine	
5	 Mini Microcentrifuge	

6	 Food Thermometer Kit and Temperature Probe & Digital Refractometer	
7	 Laboratory - Photo 1	The dedicated laboratory is parked under the Faculty of Applied Sciences and located at B1022, Academic Block B, University Teknologi MARA, Sarawak Branch, Samarahan Campus 2
8	 Laboratory - Photo 2	

Figure 4 FOODI lab photos

All postgraduate programmes offered by Universiti Teknologi MARA Sarawak Branch are parked under the Center of Graduate Studies, which is led by Head of Center of Graduate Studies. The center has its own independent office with several course coordinators and supporting staff.

6 Universiti Kuala Lumpur (P4-UniKL)

According to the project proposal, the purchased equipment shall be installed in a designated room/laboratory or a dedicated space within the existing laboratory as quoted “Establishment of a “FOODI Center of Excellence ” in each partner institution to run MSc programs and vocational training courses on “Food processing and Innovation. The acquired equipment will be installed in these laboratories ready to be used for the delivery of the program in WP4 and for research and networking purposes during and after the

project”. At the same time, we also allow and understand that each Asian institution will have specific/unique procedures according to their institutional context.

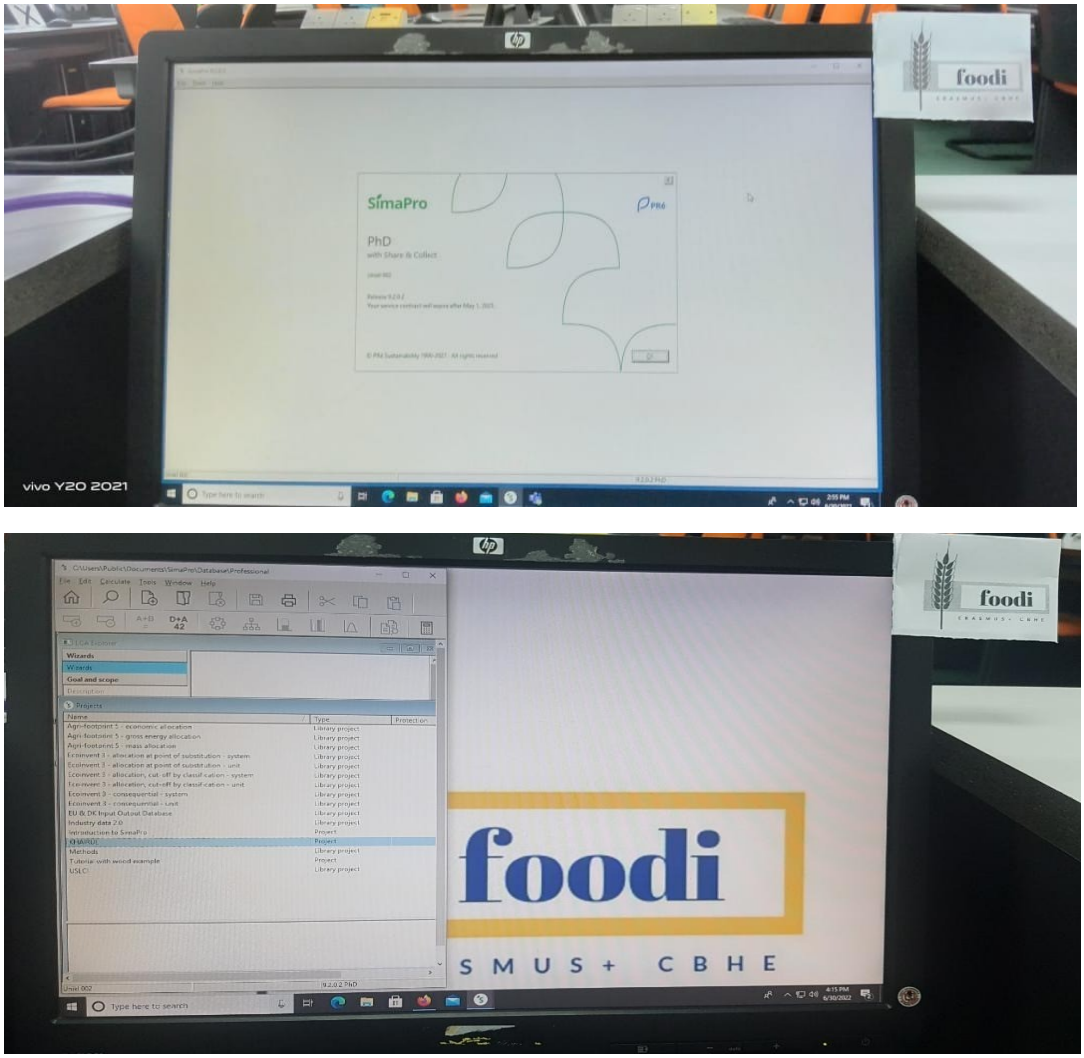


Figure 5 Sima Pro Software

Figure 6 Pre GMP laboratory

Figure 7 FOODI Centre of Excellence room

Figure 8 GMP Laboratory

A room for FOODI Center of Excellence, UniKL MICET is located in the front area of UniKL MICET to allow easy accessibility. Dr Noriza has been appointed as a coordinator of MSc. in Food Processing and Innovation. Additionally, there are four technical staffs who will provide technical assistance if required. There are enough classrooms and laboratory facilities and equipment to be shared among the students in UniKL MICET. There are currently fourteen faculty members in the Food Engineering Technology department who will participate in the MSc program's implementation.

Most of the equipment purchased will be located in GMP lab and Pre GMP lab as most of the equipment are small monitoring quality device except for Sima-Pro software which is placed in Computer Laboratory to allow free access to students and staff. The equipment can be relocated from laboratory to laboratory based on its application.

The delay in delivery of the new equipment will not affect the delivery of the courses because similar equipment from previous model and different brand are available in our laboratory for students use. The new purchased equipment are taken into consideration internet of thing (IOT) such as wireless data collection.

7 University of Heng Samrin Thbongkhmum (P5 - UHST)

The 13-equipment purchased are placed the room Name “FOODI Center of Excellence”, Second floor of Laboratory Building at University of Heng Samrin Thbongkhmum. This room placed for the equipment of FOODI project with the project logo and Eu logo are sticked on these 13 equipment as shown in the below figures. Moreover, as FOODI Center of Excellence Regulation, masteral students in Food Processing and Innovation have priority to use this 13 equipment. This room noted that FOODI Center of Excellent with project logo, EU logo and all HEIs logo which involve to implement the project.

Figure 9 Therma 1 Industrial Thermometer -99.9 to 299.9°C

Figure 10 Therma-Hygrometer - hygrometer thermometer

Figure 11 Figure 3: SET SOXHLET 250ml

Figure 12 Heat mantle 500ml

Figure 13 Alcohol distilled

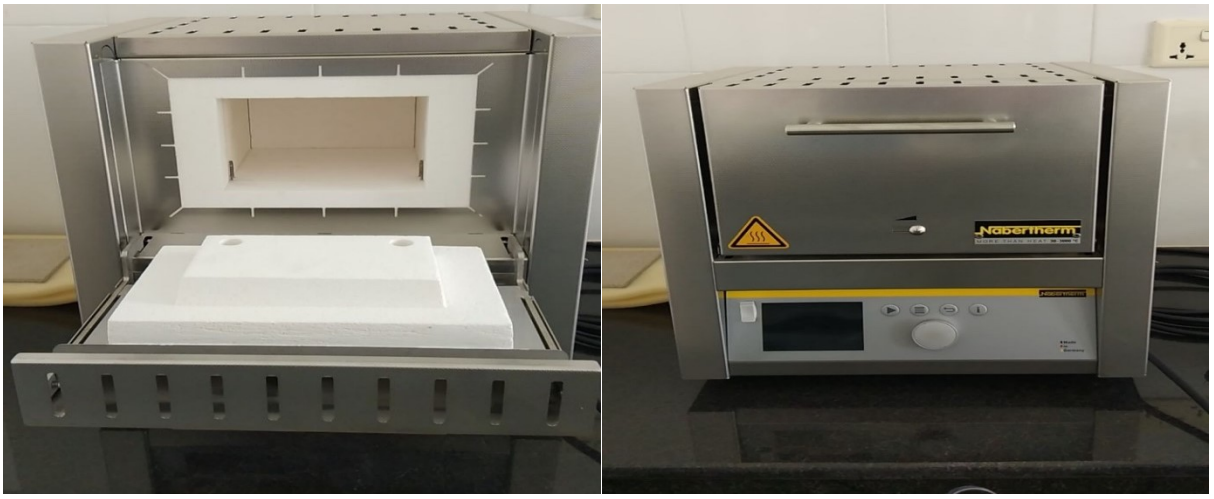


Figure 14 Muffle Furnase 3L

Figure 15 Fruit Hardness Tester

Figure 16 Superior desiccator vacuum Dia 300mm

Figure 17 Universal Oven UN110

Figure 18 Titration set

Rocker 300

Figure 19 Filtration system for microbiology

Figure 20 Brix Refractometer

Figure 21 Micropipette 100 ul

the 13 equipment are placed in room name “FOODI Center of Excellent”, Second Floor of Laboratory building. FOODI logo and EU logo are attached to this 13 equipment. Ms. UON Sophal who is currently admin staff of FOODI project at UHST will work as secretary. There are enough classrooms suitable for organizing training and MSc courses. Dr. PIN Tara who is member of steering committee under FOODI project will serve as the Director/Coordinator of this excellence center. There are enough faculties/instructors involved with teaching for MSc FOODI and Ms. UON Sophal is FOODI secretary.

Figure 22 Laboratory building

Figure 23 FOODI Lab allocated space

8 University of Battambang (P6-NUBB)

According to the project proposal, the purchased equipment shall be installed in a designated room/laboratory or a dedicated space within the existing laboratory as quoted “Establishment of a “FOODI Center of Excellence” in each partner institution to run MSc programs and vocational training courses on “Food processing and Innovation. The acquired equipment will be installed in these laboratories ready to be used for the delivery of the program in WP4 and for research and networking purposes during and after the project”. At the same time, we also allow and understand that each Asian institution will have specific/unique procedures according to their institutional context.

The 7 equipment purchased are placed in room Food Safety of Faculty of Agriculture and Food Processing at NUBB. Project logo and EU logo are sticked on these 7 equipment as shown in the below figures. As FOODI Center of Excellence Regulation, MSc students in Food Processing and Innovation have priority to use this equipment.

Figure 24 Installing the 7 equipment in Food Safety room

9 Svay Reing University (P7-SRU)

According to the project proposal, the purchased equipment shall be installed in a designated room/laboratory or a dedicated space within the existing laboratory as quoted “Establishment of a “FOODI Center of Excellence” in each partner institution to run MSc programs and vocational training courses on “Food processing and Innovation. The acquired equipment will be installed in these laboratories ready to be used for the delivery of the program in WP4 and for research and networking purposes during and after the project”. At the same time, we also allow and understand that each Asian institution will have specific/unique procedures according to their institutional context.

The 5 equipment purchased are placed in room G101 of Faculty of Agriculture Building at SRU campus. Project logo and EU logo are sticked on these 5 equipment as shown in the below figures. As FOODI Center of Excellence Regulation, MSc students in Food Processing and Innovation have priority to use this equipment.

Figure 25 Universal Oven UN110

Figure 26 Shimadzu moisture balance (MOC63U)

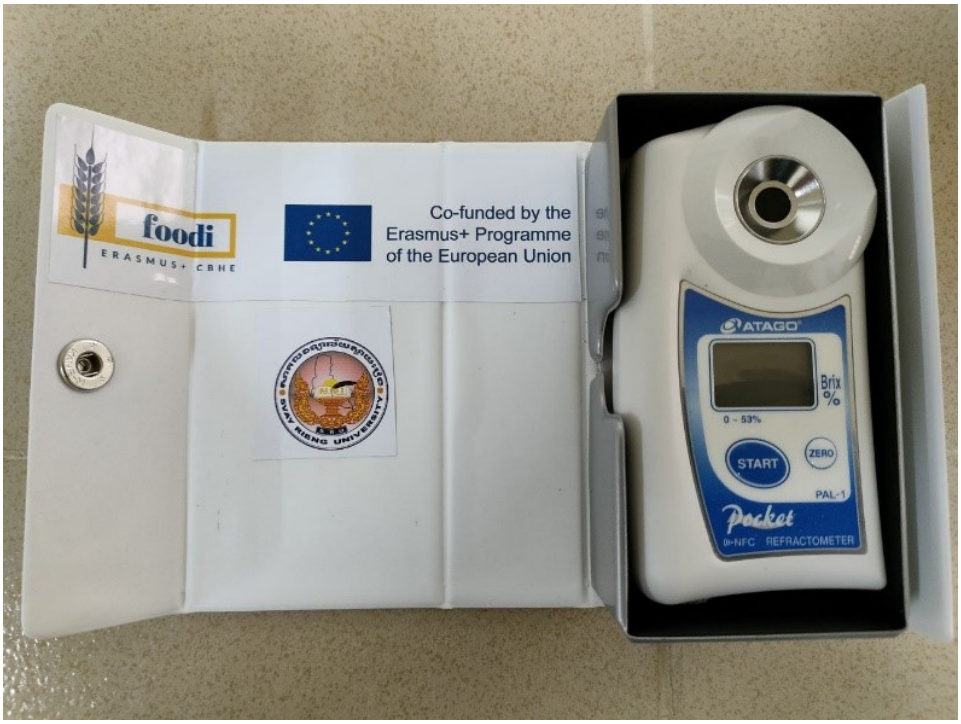


Figure 27 Atago PAL-1 (Pocket Refractometer)

Figure 28 Horiba Laqua (Multiparameter, water quality control)

Figure 29 WR Series portable colorimeter

The room of FOODI Center of Excellence, SRU, is located near the room of Faculty of Agriculture. Mr. KONG Saroeun, who is currently an administrative staff of Faculty of Agriculture, will work as secretary and a coordinator of this center. Additionally, Mr. SREY Lida and Ms. CHHENG Botum are lab assistances. There are enough classrooms suitable for organizing training and MSc courses. Dr. SEREY Mardy who is member of steering committee of FOODI project will serve as the coordinator of MSc FOODI Program. There are enough faculties/instructors involved with teaching for MSc FOODI and some lecturers can be invited from partner universities.

Figure 30 FOODI Center of Excellence Assistants

Figure 31 FOODI Center of Excellence Room allocated

10 Institute of Technology of Cambodia (P8-ITC)

The three pieces of equipment purchased are placed room B204 of Building B at Institute of Technology of Cambodia. For the meantime, some laboratories including B204 will be renovated; therefore, equipment will be moved to room B201 first. Project logo and Eu logo are sticked on these 3 equipment as shown in the below figures. Moreover, as FOODI Center of Excellence Regulation, masteral students in Food Processing and Innovation have priority to use these 3 equipment.

Figure 32 abculture® Class II Type A2 Biological Safety Cabinet

Figure 33 Shimadzu Precision balance TX series

Figure 34 Laqua Benchtop pH meter/ORP/Temperature

Ms. PHAL Sophoan who is currently admin staff of FOODI project at ITC works as secretary. There are enough classrooms suitable for organizing training and MSc courses. Dr. MITH Hasika who is member of steering committee under FOODI project is the Director/Coordinator of this excellence center. There are enough faculties/instructors involved with teaching for MSc FOODI and Ms. Phal Sophoan is FOODI secretary.

11 Asian Institute of Technology (P10 - AIT)

AIT has separated a designated space (5 x3) for allocating the purchased equipments as Foodi Center of Excellence as illustrated by the picture. This center is located in the Biotechnology building of Department of Food, Agriculture, and Bioresources. The center facilitates the use of these two equipments for teaching and conducting experiments with the FOODI students. Project logos are placed as advised on the equipment and a proper inventory list with a QR code is placed.

Figure 35 FOODI equipment (a) Centrifuge- Top Right (b) Water Activity Meter- Bottom Right placed in the Foodi Center of Excellence

Foodi Secreteriat at AIT is placed in the Biotechnology lab building which is under the Department of Food, Agriculture, and Bioresources. There are enough classrooms suitable for organizing training and MSc courses. Prof. Anil Kumar Anal who is the member of steering committee under FOODI project serve as the Director/Coordinator of this excellence center.

Figure 36 AIT Foodi Centers of Excellence rooms allocated

12 Prince of Songkhla University (P11 - PSU)

The FOODI Center of Excellence, PSU is located in Non-thermal processing Laboratory, Building 2, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai Campus, Songkhla, Thailand. The designated space of the center is 5 x 3 square meters (Figure 1) which is suitable for teaching, training and researching (Figure 2).The center facilitates the innovative nonthermal processing, the UVC liquid pasteurizer as shown in Figure 3. The center is suitable for teaching, training and researching for students in the Foodi program and food industry. Figure 3 shows the experiment of cold pasteurization of vegetable juice for the food company.

Figure 37 Foodi Center of Excellence, PSU

Figure 38 UVC liquid pasteurizer

Figure 39 The experiment of cold pasteurization of vegetable juice

The secretariat of " FOODI Center of Excellence (FOODI centers)” is located at room 211, Build 2, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai Campus, Songkhla, Thailand as shown in Figure 4). Foodi center can access to Faculty’s classrooms equipped with computer, audio system and internet as well as practical laboratories which are suitable for organizing training and teaching MSc courses (Figure 5-6). The staffs involved with Foodi Secretariat consist of Assoc. Prof. Dr. Kongkarn Kijroongrojana served as the Director, Ms. Habeebah Laman served as secretary and Mr. Suttirug Phatcharat served as an operating technician. There are 13 faculty members involved with teaching for MSc.Foodi including Prof. Dr. Soottawat Benjakul, Assoc. Prof. Dr. Kongkarn Kijroongrojana, Asst. Prof. Dr. Chakree Thongraung, Asst. Prof. Dr. Dusida Nuthong, Asst. Prof. Worapong Usawakesmanee, Assoc. Prof. Dr. Wirote Youravong, Asst. Prof. Dr. Piyarat Sirivongpaisal, Asst. Prof. Dr. Mutita Meenune, Asst. Prof. Saowakon Wattanachant, Asst. Prof. Dr. Punnanee Sumpavapol, Asst. Prof. Dr. Sunisa Siripongvutikorn, Asst. Prof. Dr. Rajnibhas Sukeaw Samakradhumrongthai and Dr. Thanasak Sae-leaw.

Figure 40 FOOCI Centers secretary offices, PSU

Figure 41 Classroom and computer rooms for teaching and training

13 Annex I - 5.4 List of FOODI Center Equipment purchased per partner

WP 3.2

Co-funded by the Erasmus+ Programme of the European Union

COUNTRY	Malaysia
Currency conversion rate	XXX/EUR

UNIVERSITY	**P-1 Universiti Teknologi Malaysia**

Item	Description & Specification	Model number:	Company	Number of items	Price/item (RM)	Total price (RM)	Total price (EUR) Rate: 4.935	Justification	Date of Order	Delivery date
1	Continuous Sealing Machine	FRD-1000C	MYCelik Minda Sdn Bhd	2	4,000.00	8,000.00	1621.07	The equipment will be used by the students for them to get a first-hand learning experience by performing different experiments on their own	5 June 2021	11 August 2021
2	Vacuum Sealing Machine	DZQ-420Q		2	4,400.00	8,800.00				
3	Bench Top Sterilizer	LSC-24C		2	2,200.00	4,400.00	1783.18			
4	Rotational Viscometer	VISCO895		2	8,400.00	16,800.00	3404.26			
5	Moisture Analyzer	MS-70/MX-50 MF-50/ML-50		2	5,800.00	11,600.00	2350.56			
6	Auto Filling And Sealing Machine	BC-3F22		2	8,350.00	16,700.00	3383.99			

P-2 University of Malaya

WP

Co-funded by the Erasmus+ Programme of the European Union

UNIVERSITY	**P-2 University of Malaya**

COUNTRY	Malaysia	
Currency conversion rate	4.7575	MYR / EUR

Item	Description & Specification	Model number:	Company	Number of items	Price/ item (MYR)	Total price (MYR)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Potentiostat/Galvanostat / ZRA	Interface 1010E	Asepetec Sdn Bhd	1	45,000	45,000	9,458.75	To characterize food compositions and interactions, and to determine the acidity or alkalinity of foods. In addition, for biological analysis and food characterization	19-05-2020	07-09-2020
2	Hydrothermal autoclave reactor for material preparaton	TOPT-HT100-PTFE	IKE SOLUTIONS SDN BHD	2	1167	2334	490.60	To prepare materials using hydrothermal method.	01-11-2021	02-12-2021
3	Electronic compact analytical balance	HR250-AZ	IDL SCIENTIFIC SDN BHD	1	3500	3500	735.68	This balance is used to measure the components for the preparation and characterization	01-11-2021	05-04-2022

UNIVERSITY	**P-3 Universiti Teknologi MARA**

COUNTRY	Malaysia	
Currency conversion rate	4.7575	RM/EUR

Item	Description & Specification	Model number:	Company	Number of items	Price/ item (RM)	Total price (RM)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Food Thermometer Kit and Temperature Probe	Testo 0563 1063	Tenaga Wawasan	1	315	315	66.21	Item required for the intended program	17 August 2020	17 November 2020
2	Pasteurization Machine	LP-5	Tenaga Wawasan	1	4,800	4,800	1,008.93	Item required for the intended program	17 August 2020	17 November 2020
3	Digital Refractometer	PAL-3 3830	Tenaga Wawasan	1	4,374	4,374	919.39	Item required for the intended program	17 August 2020	17 November 2020
4	Mini Microcentrifuge	GYROZEN GZ-1312	Tenaga Wawasan	1	2,851	2,851	599.26	Item required for the intended program	23 October 2020	23 January 2021
5	Design Expert 12(DX) Software	DX12	IOC Quality Services	1	7,991.12	7,991.12	1,679.69	Item required for the intended program	17 August 2020	17 November 2020

6	Autoclave (For Retort)	35J-CP	Tiga Batu Packaging Sdn. Bhd	1	28,731.50	28,731.50	6,039.20	Item required for the intended program	28 October 2020	7 May 2021 (Installation and Commissioning still pending)
7	Vertical Type Sealing Machine		Tiga Batu Packaging Sdn. Bhd	1	2,590.00	2,590.00	544.40	Item required for the intended program	28 October 2020	7 May 2021 (Installation and Commissioning still pending)

WP

Co-funded by the Erasmus+ Programme of the European Union

UNIVERSITY	**P-4 UNIVERSITY KUALA LUMPUR**

COUNTRY	Malaysia
Currency conversion rate	0.22/EUR

Item	Description & Specification	Model number:	Company	Number of items	Price/item (RM)	Total price (RM)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Food basic reactor	IKA LR 1000 BASIC (8040102)	IKA WORKS (ASIA) SDN BHD	1	35950.00	35,950	7909	Preliminary / lab scale process equipment before scale up	5 Oct 2021	10 Jan 2023

2	Wireless pH meter	Hanna	IKA WORKS (ASIA) SDN BHD	1	1487.00	1487.00	327.14	Monitoring equipment for food safety monitoring	5 Oct 2021	10 Jan 2023
3	Data Loggers	Testo 184 T3 Testo 184 H1 Testo 184 G1	PORTRAY (M) SDN BHD	3	4340.00	4340.00	954.8	Monitoring equipment for food safety monitoring	5 Oct 2021	7 Feb 2023
4	Digital pocket Refractometer	ATAGO / PAL-H	BUMI JIWA SDN BHD	1	2300	2300	506	Monitoring equipment for food safety monitoring	5 Oct 2021	7 Feb 2023
5	Life cycle analysis Software	Sima Pro PhD	PRé Sustainability B.V.	1	22028.76	22028.76	4846	Assessing sustainability of process or product	5 Oct 2021	22 March 2022
	Total						14542			

Co-funded by the Erasmus+ Programme of the European Union

UNIVERSITY	**P-5 University of Heng Samrin Thbongkhmum**

COUNTRY	Cambodia	
Currency conversion rate	1.187	USD/ EUR

Item	Description & Specification	Model number:	Company	Nusmber of items	Price/item (USD)	Total price (USD)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Therma 1 Industrial Thermometer -99.9 to 299.9°C	ETI	X-LAB CO., LTD	5	250.00	1,250.00	1,053.07	Approved by Coordinator	25-01-21	13-03-21

	- Stainless steel hand held penetration probe Type K, 75 to250°C, LONG 1M Specification: - Range 0.1 ^{0}C : -99.9 to 299.9^{0}C - Range 1 ^{0}C : 300 to 1372 ^{0}C - Resolution: 0.1^{0}C & 1^{0}C - Accuracy: ±0.4^{0}C ±0.1% - Battery: 3 x 1.5 volt AAA - Battery life minimum 5years (10000 hours) - Sensor type: K thermocouple - Display: 12mn LCD - Dimensions: 25 x 56 x 128mm - Weight: 130 grams - Case material: ABS plastic with Biomaster anti-bacterial additive - Country manufacture: United Kingdom - Guarantee: Two years - Water/Dust resistance: IP64 when using 820-253 boot - Measurement Scale: Celsius/Fahrenheit Application : ETI's Therma 1 digital thermometer is suitable for use in practically any temperature application; this industrial-grade professional thermometer is designed for use with a wide variety of interchangeable type K thermocouple probes (sold separately), which can be used to test everything from food to air temperatures.									

2	Therma-Hygrometer - hygrometer thermometer Specification: - Range internal: Temperature: 0 to 49.9^{0}C – humidity: 20 to 99%rh - Range external: Temperature: -49.9 to 69.9^{0}C - Resolution - Temperature: 0.1^{0}C/^{0}F - Resolution - Humidity: 1%rh - Accuracy - Temperature: ±1^{0}C - Accuracy - Humidity: ±5%rh - Battery: 1.5 volt AAA - Battery life: 10000 hours - Sensor type: Temperature: thermistor – humidity: capacitance - Display: Dual custom LCD - Dimensions: 25 x 65 x 97mm - Weight: 70 grams - Case material: ABS plastic - Guarantee: One year - Measurement Scale: Celsius/Fahrenheit & &rh Application: Measure and display both temperature and humidity at the same time with the ETI 810-155 therma-hygrometer! Both temperature and humidity can be measured using built-in sensors with range from 20 to 99% RH for humidity and 0 to 49.9°C. An external temperature sensor probe is also included which can be used to measure	ETI	X-LAB CO., LTD	5	65.00	325.00	273.80	Approved by Coordinator	25-01-21	13-03-21

	temperature from a specific area from -49.9 to 69.9°C. When temperatures reach 0°C or below (as detected by the remote probe), the 810-155 will sound an audible alarm. This is ideal for use in frost/freeze alerting in horticulture and similar applications.									
3	SET SOXHLET 250ml inclued: 035.11.250 Soxlet condenser "allihn" 250ml, NS 45/40 036.01.250 Soxlet extractor "w/o stopcok" 250ml, NS 45/40 030.02.501 Round bottom flask 500ml , NS 29/32 Application: Soxhlet apparatus: an apparatus for use in extracting fatty or other material with a volatile solvent (such as ether, alcohol, or benzene) consisting of a vertical glass cylindrical extraction tube that has both a siphon tube and a vapor tube, that is fitted at its upper end to a reflux condenser and at its lower end to a flask so that the solvent may be distilled from the flask into the condenser whence it flows back into the cylindrical tube and siphons over into the flask to be distilled again. -A schematic representation of a Soxhlet extractor 1: Stirrer bar	ISOLAB	X-LAB CO., LTD	6	200.00	1,200.00	1,010.95	Approved by Coordinator	25-01-21	13-03-21

	2: Still pot (the still pot should not beoverfilled and the volume of solvent in the still potshould be 3 to 4 times the volume of the soxhlet chamber) 3: Distillation path 4: Thimble 5: Solid 6: Siphon top 7: Siphon exit 8: Expansion adapter 9: Condenser 10: Cooling water out 11: Cooling water in - Animation of Soxhlet extractorworking - Fruit extraction in progress. The sample is placed in the thimble. - The siphoning part of a Soxhlet extraction.									
4	Heat mantle 500ml	98-I-B 500m	X-LAB CO., LTD	6	120.00	720.00	606.57	Approved by Coordinator	25-01-21	13-03-21
5	Alchohol distilled (1 Round flask 1000ml + 3 adapter+ thermometer -20 -> 1100C + 1 rubber) <u>Application:</u> Distillation, or classical distillation, is the process of separating the components or substances from a liquid mixture by using selective boiling and condensation. Dry distillation is the heating of solid materials to produce gaseous products (which may condense into liquids or solids).	LM	X-LAB CO., LTD	2	519.50	1,039.00	875.32	Approved by Coordinator	25-01-21	13-03-21

6	Muffle Furnase 3L Specification: - Muffle Furnaces with Flap Door - Brand: Nabertherm - Temperature Max: 1100oC - Inner Dimension: 160x140x100 9WxdxH) - Volume around 3L - Electricity 1 Phase Application: Muffle Furnaces are used for high-temperature testing applications such as loss-on-ignition or ashing. Muffle Furnaces are compact countertop heating sources with insulated firebrick walls to maintain high temperatures.	Nebertherm L3/11	X-LAB CO., LTD	1	3,650.00	3,650.00	3,074.98	Approved by Coordinator	25-01-21	13-03-21
7	Fruit Hardness Tester Specification: - Unit: Kgf(kgf/cm^2) lbf(lbf/cm^2) N(N/cm^2) Pa - Tip Diameter: 7.9mm, 11.1mm - Range: 0.2 ~ 11.0 kgf/cm^2, 0.4 ~ 22.0 kgf/cm^2 - Resolution: 0.01/0.1/1 - Accuracy: ±(1%H+0.1)kgf/cm^2 - Pressing Depth: 10mm - Operating Conditions: Temperature: 0 ~ 45 ^{0}C, Humidity: <90%RH - Power supply: 2X1.5V AAA, Size: (UM-4) Battery - Dimensions: 204 x 62 x 33mm (8.0 x 2.4 x 1.3 inch) - Weight: 230g (Not including Batteries)	FHT-1122	X-LAB CO., LTD	2	500.00	1,000.00	842.46	Approved by Coordinator	25-01-21	13-03-21

	- Standard Accessories: Main Unit, 7.9mm Tip, 11.1mm Tip, Wrist Strap /Carrying Case (B04)/Operation Manual Application: The Fruit Hardness Tester is a handheld compact penetrometer for fruit and some vegetable									
8	Supperior desiccator vacuum Dia 300mm Application: Desiccators are sealable enclosures containing desiccants used for preserving moisture-sensitive items such as cobalt chloride paper for another use. A common use for desiccators is to protect chemicals which are hygroscopic or which react with water from humidity.	Duran	X-LAB CO., LTD	1	521.00	521.00	438.92	Approved by Coordinator	25-01-21	13-03-21
9	Universal Oven UN110 Specification: - Manufacturer: Memert, Germany - Temperature range: min. 5°C above ambient up to +300°C Application: Laboratory ovens are used in a wide range of applications in industries such as biotech, pharmaceuticals and materials manufacturing. These industries often require the process of baking, curing, annealing and drying materials of varying chemical and physical compositions. Many of	UN110, 110L	X-LAB CO., LTD	1	3,190.00	3,190.00	2,687.45	Approved by Coordinator	25-01-21	13-03-21

	these process applications are unique in their end-result and require assorted types of lab ovens.									
10	Titration set - White Burettes PTFE stopcock 25ml - Stand for burret - Double Burette clamps Application: Titration is an analytical technique that is widely used in the food industry. It allows food manufacturers to determine the quantity of a reactant in a sample. For example, it can be used to discover the amount of salt or sugar in a product or the concentration of vitamin C or E, which has an effect on product colour.	-	X-LAB CO., LTD	5	70.00	350.00	294.86	Approved by Coordinator	25-01-21	13-03-21
11	Filtration system for microbiology Specification 1: - Max. vacuum: 313 mbar - Max. liquid flow rate: 0.5 L/min - Weight: 1.16kg - Power: DC12 V, 1.0A - Dimensions(LxWxH): 17 x 12 x 9.6 cm Application: - MF Technique for analyzing aqueous-based fluids for microbial contamination. - Suspended Solid test for municipal, surface, ground and drinking water	Rocker300	X-LAB CO., LTD	1	760.00	760.00	640.27	Approved by Coordinator	25-01-21	13-03-21

	- General filtration which no need to collect filtrate									
12	Brix Refractometer Specification: - Scale range: Brix 0.0 to 53.0% - Minimum scale: 0.2% - Size: 3.2 x 3.4 x 16.8cm - Weight: 130g - Brand: Atago, JAPAN Application: The Brix scale is used to measure sugar content in substances such as soft drinks, fruit juices and tomato concentrates, but also in those such as cutting oil, which are very often far away from pure sucrose/water solutions.	Master-53M	X-LAB CO., LTD	2	165.00	330.00	278.01	Approved by Coordinator	25-01-21	13-03-21
13	Micropipette 100 ul Application: Micropipette is Pipettes that can measure liquid in microliters (µL) with precision, and are most commonly used in experiments, research and analysis in the field of life science. They aspirate and discharge liquid by volumetric displacement of air by the vertical movement of an internal piston.	Vitlab Germany	X-LAB CO., LTD	1	165.00	165.00	139.01	Approved by Coordinator	25-01-21	13-03-21
	TOTAL	-	-	-	-	**14,500.00**	**12,215.67**	-	-	-

COUNTRY	Cambodia
Currency conversion rate	16,511 EUR

UNIVERSITY	**P-6 National University of Battambong**

Co-funded by the Erasmus+ Programme of the European Union

Item	Description & Specification	Model number:	Company	Number of items	Price/item (USD)	Total price (USD)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Universal Oven UN110 Manufacturer: Memmert, Germany Temperature range: min. 5^{0}C above ambient up to +300^{0}C	UN110	XLAB Co., Ltd	1	3,509.00	3,509.00	4183.43	Use for drying, heating, ageing, burn-in and hardening	29 July 2021	23 September 2021
2	Shimadzu Moisture Balance Manufacturer: Shimadzu Japan Capacity: 60g Readability: 0.001g Repeatability: 0.02% (10g sample)	MOC63U	XLAB Co., Ltd	1	1,760.00	1,760.00	2098.27	Measures the amount of moisture in a substance	29 July 2021	23 September 2021
3	The METER AquaLab PawKit portable water activity instrument; Specification: MEASUREMENT SPECIFICATIONS - Water activity Range: 0.00-1.00 a_w Resolution: 0.01 a_w Accuracy: +0.02 a_w - Temperature Resolution: 0.1 ^{0}C Accuracy: +0.02 ^{0}C - Read time 5 min PHYSICAL SPECIFICATIONS - Case dimensions Legth:10.7 cm (14.21 in) Width:6.6 cm (2.60 in) Height: 2.0 cm (0.79 in) - Case material Stainless steel and valox 325 plastic - Sample cup capacity 7.5 mL (0.26 fl oz), recommended (15 mL (0.47 fl oz), full) • - Weight 115g (4 oz)	Pawkit	XLAB Co., Ltd	1	4,900.00	4,900.00	5841.78	Use for readings where a benchtop meter is not practical.	29 July 2021	23 September 2021

	•									
4	Atago PAL-1 (3810) Digital hand-held pocket refractometer, 0.0-53.0% Brix Range: 0-53.0% Brix Resolution: 0.1% The PAL-1 is the industry standard refractometer. Its wide range and portability allow for many different uses and applications.	PAL-1 (3810) Japan	XLAB Co., Ltd	1	352.00	352.00	419.65	To measure the various high concentration samples such as jam, marmalade, jelly, honey, concentrated juice or acidity and salinity.	29 July 2021	23 September 2021
5	Horiba Laqua, Multiparameter handhelp water quality control Parameter: pH / ORP/ Conductivity/ Resistivity/ Total dissolved solids/ Salinity 3-channel handheld	3200832 607	XLAB Co., Ltd	1	2,310.00	2,310.00	2753.98	To measure pH, conductivity and ion concentration.	29 July 2021	23 September 2021

	Model: WQ 330 Waterproof (pH/ORP/EC/TDS/RES/SAL/DO) 3-Channel handheld meter Specification of the machine - Large Colour Graphic LCD Screen with Backlight - Built-in Foldable Meter Stand - IP67 Waterproof and Dustproof - Battery and USB Powered - Built-in Sensor Holders - Data Transfer via USB or Wireless Communication									
6	Digital Viscometer VISCO™ Model: VISCO Brand: Atago, JAPAN Compact and easily carried with one hand. Battery operated—measurements can be taken anywhere. Fully digital display allows for anyone to easily read results. Capable to measure with only a small amount of sample. Easy set-up and simple, one-button operation. Capable of taking measurements with containers other than the included beakers, such as disposable paper cups. Ultra Low Adapter will allow to measure low viscosity samples (1〜2,000mPa・s). By changing the material used for body, legs and stand to alminium, unit weight is now 895g as described in the model name. Appearance and all features remain unchanged, while achieving 25% weight reduction compared to existing VISCO™.	6800	XLAB Co., Ltd	1	2,130.00	2,130.00	2539.38	Use to determine the viscosity of a fluid under specific flow and atmospheric conditions.	29 July 2021	23 September 2021
7	WR Series Portable Colorimeter MC-18 with switchable aperture (4mm, 8mm aperture) Weight: 500g Colorimeter is widely used in different industries such as plastic cement, printing, paint, weaving and	WR-18	XLAB Co., Ltd	1	1,550.00	1,550.00	1847.91	Apply for plastic, electronics, painting coating, clothing dyeing, printing, automobile,	29 July 2021	23 September 2021

	dyeing. It measures the sample color data L*a*b*, L*c*h*, color difference ΔE and ΔLab according to CIE color space Data memory: 100 standards, 20000 samples							medical, cosmetic and food, etc.		

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COUNTRY	Cambodia
Currency conversion rate	8.673.27 EUR

UNIVERSITY	**P-7 Svay Rieng University**

Item	Description & Specification	Model number:	Company	Number of items	Price/item (USD)	Total price (USD)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Universal Oven UN110 Manufacturer: Memmert, Germany Temperature range: min. 5^{0}C above ambient up to +300^{0}C	UN110, 110L	XLAB Co., Ltd	1	3,509.00	3,509.00	3,158.42	Use for drying, heating, ageing, burn-in and hardening	15 May 2020	19 March 2021
2	Shimadzu Moisture Balance Manufacturer: Shimadzu Japan Capacity: 60g Readability: 0.001g Repeatability: 0.02% (10g sample)	MOC63U	XLAB Co., Ltd	1	1,760.00	1,760.00	1,584.16	Measures the amount of moisture in a substance	15 May 2020	19 March 2021

3	Atago PAL-1 (3810) Digital hand-held pocket refractometer Range: 0.0-53.0% Brix Resolution: 0.1% The PAL-1 is the industry standard refractometer. Its wide range and portability allow for many different uses and applications.	PAL-1 (3810) Japan	XLAB Co., Ltd	1	352.00	352.00	316.83	To measure the various high concentration samples such as jam, marmalade, jelly, honey, concentrated juice or acidity and salinity.	15 May 2020	19 March 2021
4	Horiba Laqua, Multiparameter handhelp water quality control Parameter: pH / ORP/ Conductivity/ Resistivity/ Total dissolved solids/ Salinity 3-channel handheld	WQ 330 waterproof (pH/ORP/EC/ TDS/RES/SAL /DO)	XLAB Co., Ltd	1	2,310.00	2,310.00	2,079.21	To measure pH, conductivity and ion concentration.	15 May 2020	19 March 2021
5	WR Series Portable Colorimeter MC-18 with switchable aperture (4mm, 8mm aperture) Weight: 500g Data memory: 100 standards, 20000 samples	MC-18 (LED sources)	XLAB Co., Ltd	1	1,705.00	1,705.00	1,534.65	Apply for plastic, electronics, painting coating, clothing dyeing, printing, automobile, medical, cosmetic and food, etc.	15 May 2020	19 March 2021

UNIVERSITY	**P-8 Institute of Technology of Cambodia**

COUNTRY	Cambodia	
Currency conversion rate	1.0585	USD/EUR

Item	Description & Specification	Model number:	Company	Number of items	Price/item (USD)	Total price (USD)	Total price (EUR)	Justification	Date of Order	Delivery date
1	abculture® Class II Type A2 Biological Safety Cabinet Specifications: - UV-30AUV lamp - EO-HCDirect Mounted Electrical Outlet - Plug Code C - SPC-4A0Support stand with caster wheels	LA2-4A1-E (ESCO, Singapore)	XLAB Co., Ltd	1	12,038	12,038	11,372.70	Aiza and Rosmini have approved to change the previous list of equipment to this equipment on 19 November 2020 by mail	23 November 2020	05 January 2021
2	Shimadzu Precision balance TX series Specifications: - Max weight: 320g - Repeatability: 0.001g Linearity: ±0.002g - Pan Size (mm) approx. 110 mm Main body Dimension : - 206(W)×291(D)×241(H) mm One touch internal calibration	TX323L (Shimadzu, Japan)	XLAB Co., Ltd	1	930	930	878.60	Aiza and Rosmini have approved to change the previous list of equipment to this equipment on 19 November 2020 by mail	23 November 2020	05 January 2021
3	Laqua Benchtop pH meter/ORP/Temperature Specifications: - Color touch screen	F-72A-S (Horiba, Japan)	XLAB Co., Ltd	1	1,852	1,852	1,749.65	Aiza and Rosmini have approved to change the	23 November 2020	05 January 2021

	- Single channel - Electrode stand - Protection cover - Power adaptor with 6 plugs - Data acquisition software in USB - 9615S-10D - refillable, glass-body pH electrode with integrated temperature sensor, 1m cable, BNC & phono jack - 502-S - pH 4.01, 7.00, 10.01, 3.33M KCl solutions							previous list of equipment to this equipment on 19 November 2020 by mail		

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COUNTRY	Thailand
Currency conversion rate	

UNIVERSITY	**P-10 Asian Institute of Technology (AIT)**

Item	Description & Specification	Model number:	Company	Number of items	Price / item (THB)	Total price (THB)	Total price (EUR)	Justification	Date of Order	Delivery date
1	Centrifuge with water control	Varispin 12R	Nexbio (Thailand) Co.Ltd	1	240000	240000	6,399.49	This two equipment are useful to the FOODI students for the lab experiments conducting experiments for biomacromolecule separation and identification.	Nov 2020	25 Feb 2020
2	Water Activity set	EZ-200	Materno Co.Ltd	1	195000	195000	5,199.58		Nov 2020	03 Mar 2020
3	Water/Oil Bath (0-300 degrees)		Chanjao Longevity Co.Ltd	1	8990	8990				

4	Type K thermometer with RS232		Themtech Co. Ltd, Thailand	1	1080 8.07	1080 8.07				
5	SDS-PAGE		NexBio, Thailand	1	7737 1.70	7737 1.70				

UNIVERSITY	**P–11 Prince of Songkla University**

Currency conversion rate		37.503/EUR

Item	Description & Specification	Model number:	Company	Number of items	Price/item (Baht)	Total price (Baht)	Total price (EUR)	Justification	Date of Order	Delivery date
1	UVC Liquid Pasteurizer	TFF UVC 50	TSUS FEBIX FOODTECH CO.,LTD.	1	524,485.98	524,485.98	13,985.17	UVC liquid pasteurizer is a machine which use for extending shelf life in juices & beverages. This machine will be supported courses related to the Innovation Processing. Using UVC light which is non-thermal process. To preserve freshness, quality, and nutrition in products. Better than ordinary thermal process. The machine can run in continuous process with aseptic filling.	24 Apr 2020	8 Jul 2020