



Doctor of Philosophy in Food Science

(International Program)

2017 Reversion

Faculty of Food Industry

King Mongkut's Institute of Technology Ladkrabang

**Doctor of Philosophy in Food Science  
(International Program)  
2017 Reversion**

**Name of Institution** King Mongkut's Institute of Technology Ladkrabang (KMITL)  
**Faculty** Faculty of Food Industry

**Part 1: General Information**

**1. Program Title** : Doctor of Philosophy in Food Science (International Program)

**2. Degree offered and Field of Study**

Full Name : Doctor of Philosophy (Food Science)

Abbreviations : Ph.D. (Food Science)

**3. Core Course or Special requirement courses (If any)**

-

**4. Total Credits**

Study Plan 1: Applicants who hold master's degree Not less than 139 credits

Study Plan 2: Applicants who hold master's degree Not less than 139 credits

**5. Types of Program**

5.1 Type: Doctoral degree

5.2 Language: English program

5.3 Collaboration with other institutions: Program issued specifically by KMITL

5.4 Admission: Both Thai and international students

5.5 Degree Conferment: One degree from KMITL

**6. Record of Program Status and Approval Status of the Program and Consideration for the Authorization/Agreement**

Revised Curriculum, course begin ~~August 2019~~

The program has been endorsed by Academic Council in its meeting No. ~~11/2016~~  
on ~~22<sup>nd</sup> November 2016~~

The program has been endorsed by KMITL Council in its meeting No. ~~12/2016~~  
on ~~21<sup>st</sup> December 2016~~

## 7. Expected Date for Thai Qualifications Register (TGR)

Academic Year 2017

## 8. Career Paths

- (1) Work as Food Quality Assurance Researcher.
- (2) Work as Food Scientist, Food Specialist, Food Research and Development Scientist and Food Structure Analysis Specialist in the food/allied industries or federal/state regulatory agencies, educational institutions, and research institutes.
- (3) Work as a Freelancer in Food industry.

## 9. Instructors Details

Name-Surname (Academic Position)	Qualifications (Field of Study) Academic year	University
1. Assoc.Prof.Dr. Ruchira Taprap (Food Science and Technology)	B.Sc. (Chemistry) 1980 M.Eng. (Chemical Engineering) 1988 Ph.D. (Environmental Chemistry and Engineering) 1995	Khon Kaen University Chulalongkorn University Tokyo Institute of Technology, Japan
2. Assoc.Prof.Dr. Warawut Krusong (Food Science and Technology)	B.Sc. (Biology) 1982 B.S. (Microbiology) 1985 Ph. D. (Food Science) 1990	Kasetsart University Kasetsart University University of the Los Banos, Philippines
3. Asst.Prof.Dr.Soraya Kerdpiboon (Food Science and Technology)	B.S. (Fisheries) 1999 B.S. (Food Science) 2002 Ph.D. (Food Engineering) 2006	Kasetsart University King Mongkut's Institute of Technology Ladkrabang (KMITL) King Mongkut's University of Technology Thonburi (KMUTT)

## 10. Location of Study

King Mongkut's Institute of Technology Ladkrabang

## 11. External Situation of Development Needed to be Considered for Planning of the Program

### 11.1 Economic Situation/Development

The development of science and technology is an important strategy that enhances the Economic and social growth in the country. In order to compete internationally, the Creative economy has played an important role in a wide range of industries, especially in processed agricultural products to increase the value of the products. Moreover, Green technology,

environmental-friendly technology, has been applied since it can conserve energy and resources and reduce agricultural waste. Thus, it is important to prepare the leading specialist and researcher to meet the need of the development of country; furthermore, it is necessary to increase the number of post-doctoral researcher regarding to the 15-year Higher Education Development Plan (2008-2022)

### **11.2 Social and Cultural Situation/Development**

The rapidity of cultural exchange in neighboring regions causes the diversity of food and consumer culture. In addition, the way of life that is full of activity and responsibility has diminished home-cooked meals; thus, ready-made foods and convenience foods have played an important role in consumer culture. For this reason, it is important to prepare modern food specialists in order to satisfy the needs of society. According to ASEAN Economic Community (AEC), the industrial workers are demanding to improve their skills for the development of AEC manufacturing.

## **1.2 Effects from 11.1 and 11.2 on Development of the Program and the Relation to the Mission of the Institute**

### **12.1 Program Development**

Improve the program respected to the demand of high-qualified researcher in food science and technology

### **1.2.2 Related Institutional Missions**

12.2.1 Produce qualified graduates with full knowledge of food science at an advanced level as well as morality and ethics regarding the demand of federal/state regulatory agencies and industries sectors.

12.2.2 The doctoral degree provides the opportunities for the graduates to contribute the research and innovation, resulting in advancing higher education ranking and internationally targeted achievement.

## Curriculum and Program Instructors

Program the details are as follows.

### Total credits

Plan 1.1 Not less than 48 credits

Plan 2.1 Not less than 48 credits

### Program Structure

#### Plan 1.1

**48 credits**

A. Dissertation

48 credits

B. Core Courses (not including in required credits)

5 credits

C. Seminar (not including in required credits)

2 credits

#### Plan 2.1

**48 credits**

A. Dissertation

48 credits

B. Core Courses

3 credits

Core Courses (not including in required credits)

2 credits

C. Elective Courses\*

9 credits

D. Seminar (not including in required credits)

2 credits

\* The students are required to choose elective courses of doctoral degree from other subject fields of King Mongkut's Institute of Technology Ladkrabang related with dissertation and under the advisor's approval.

### Courses

#### Plan 1.1: Research based

- Core Courses (not including in required credits)

5 credits

- Seminar (not including in required credits)

2 credits

- Dissertation

48 credits

#### Core Courses (not including in required credits)

**5 credits**

Credits

(Lecture-Practice-Self-study)

08117111 SUSTAINABLE FOOD PROCESSING

3 (3-0-6)

08117112 TECHNIQUES IN SCIENTIFIC COMMUNICATION

2 (2-0-4)

**Seminar (not including in required credits)**

**2 credits**

Credits

(Lecture-Practice-Self-study)

08218303 SEMINAR IN RESEARCH PROGRESS 1

1 (0-2-0)

08218304 SEMINAR IN RESEARCH PROGRESS 2

1 (0-2-0)

**Dissertation**

**48 credits**

Credits

(Lecture-Practice-Self-study)

08218409 THESIS

48 (0-144-0)

**Plan 2.1: Research and study based**

- Core Courses 3 credits
- Core Courses (not including in required credits) 2 credits
- Elective Course 9 credits
- Seminar (not including in required credits) 2 credits
- Dissertation 36 credits

**Core Courses**

**3 credits**

Credits

(Lecture-Practice-Self-study)

08117111 SUSTAINABLE FOOD PROCESSING

3 (3-0-6)

08117112 TECHNIQUES IN SCIENTIFIC COMMUNICATION  
(not including in required credits)

2 (2-0-4)

**Seminar (not including in required credits)**

**2 credits**

Credits

(Lecture-Practice-Self-study)

08218303 SEMINAR IN RESEARCH PROGRESS 1  
(not including in required credits)

1 (0-2-0)

08218304 SEMINAR IN RESEARCH PROGRESS 2  
(not including in required credits)

1 (0-2-0)

**Elective Course****9 credits**

Elective Courses are as follows, or the students can select from other elective courses under the cooperation with Academic Affair.

		Credits
		(Lecture-Practice-Self-study)
08218112	ADVANCED FOOD TOXICOLOGY	3(3-0-6)
08218113	BIOCHEMICAL METHODS FOR FOOD RESEARCH	3(3-0-6)
08218118	GENETIC ENGINEERING IN FOOD INDUSTRY	3(3-0-6)
08218120	PHASE TRANSITION IN FOODS	3(3-0-6)
08218122	ADVANCED FOOD PACKAGING TECHNOLOGY	3(3-0-6)
08218123	ADVANCED INDUSTRIAL FERMENTATION TECHNOLOGY	3(3-0-6)
08218125	FOOD RHEOLOGY	3(3-0-6)
08218126	FUNCTIONAL AND MEDICAL FOOD	3(3-0-6)
08218127	FOODOMICS	3(3-0-6)
08218128	MICROBIOLOGICAL TECHNOLOGY FOR FOOD FLAVOR PRODUCTION	3(3-0-6)

**Dissertation****36 credits**

		Credits
		(Lecture-Practice-Self-study)
08218410	THESIS	36 (0-108-0)

**Qualifying Examination****0 credits**

		Credits
		(Lecture-Practice-Self-study)
99082181	THESIS DEFENSE	0 (0-0-0)
99082182	QUALIFYING EXAMINATION	0 (0-0-0)
99082184	ENGLISH PROFICIENCY TEST	0 (0-0-0)

## Study Plan

### Plan 1.1

#### 1<sup>st</sup>Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08117112	TECHNIQUES IN SCIENTIFIC COMMUNICATION (not including in required credits)	2 (2-0-4)
08218409	THESIS	6 (0-18-0)
Total credits		6

#### 1<sup>st</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08117111	SUSTAINABLE FOOD PROCESSING	3(3-0-6)
08218409	THESIS	6 (0-18-0)
Total credits		6

#### 2<sup>nd</sup> Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08218409	THESIS	12(0-36-0)
Total credits		12

#### 2<sup>nd</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08218303	SEMINAR IN RESEARCH PROGRESS 1 (not including in required credits)	1(0-2-0)
08218409	THESIS	12 (0-36-0)
Total credits		12



3<sup>rd</sup> Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08218409	THESIS	6(0-36-0)
Total credits		6

3<sup>th</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08218304	SEMINAR IN RESEARCH PROGRESS 2 (not including in required credits)	1(0-2-0)
08218409	THESIS	12 (0-36-0)
Total credits		6

The total credits

48

Credits

Plan 2.1

1<sup>st</sup> Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08117112	TECHNIQUES IN SCIENTIFIC COMMUNICATION (not including in required credits)	2 (2-0-4)
08218xxx	ELECTIVE COURSE	3(.....)
Total credits		3

1<sup>st</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08117111	SUSTAINABLE FOOD PROCESSING	3(3-0-6)
08218xxx	ELECTIVE COURSE	3(3-0-6)
Total credits		6

2<sup>nd</sup> Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08218409	THESIS	6(0-18-0)
08218xxx	ELECTIVE COURSE	3(3-0-6)
Total credits		9

2<sup>nd</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08218410	THESIS	12(0-36-0)
08218303	SEMINAR IN RESEARCH PROGRESS 1 (not including in required credits)	1(0-2-0)
Total credits		12

3<sup>rd</sup> Year: 1<sup>st</sup> semester

Code	Subject	Credits (L-P-S)
08218410	THESIS	12 (0-36-0)
Total credits		12

3<sup>rd</sup> Year: 2<sup>nd</sup> semester

Code	Subject	Credits (L-P-S)
08218410	THESIS	6(0-18-0)
08218409	SEMINAR IN RESEARCH PROGRESS 2 (not including in required credits)	1(0-2-0)
Total credits		6

The total credits

48

Credits

Name, Academic Position, Qualifications Program Instructors

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
<p>1. Assoc.Prof.Dr. Ruchira Taprap (Food Science and Technology)</p>	<p>B.Sc. (Chemistry) Khon Kaen University, 1980</p> <p>M.Eng. (Chemical Engineering) Chulalongkorn University, 1988</p> <p>D. Eng. (Environmental Chemistry and Engineering) Tokyo Institute of Technology, Japan, 1995</p>	<p><b>1. Selected Publications</b></p> <p><b>2. Books</b> <i>Food Process Engineering 2</i></p> <p><b>3. Teaching Subjects</b> Food Plant and Process Design (3 hrs./week) - Seminar (1 hr./week) -Thesis (3 hrs./week)</p>
<p>2. Assoc.Prof.Dr. Warawut Krusong (Food Science and Technology)</p>	<p>-B.Sc. (Biology) Kasetsart University, 1982</p> <p>B.S. (Microbiology)Kasetsart University, 1985</p> <p>Ph. D. (Food Science) University of the Los Banos, Philippines, 1990</p>	<p><b>1. Selected Publications</b></p> <p><b>2. Books</b> <i>-Biotechnology</i> <i>Microbiology in food processing</i>, Odeon Store Publishing (1986), Page 163 <i>-Industrial Fermentation Technology</i>, Odeon Store Publishing (1989), Page 210 <i>-Microbiology of Food Processing</i>, Odeon Store Publishing (1995), Page 210 <i>-Biotechnology (Revised version)</i> King Mongkut's Institute of Technology Ladkrabang(1996), Page 213 -Contributor Chapter 14 Production of Thai Fermented Fish: Plara, Pla-som,</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Som-fakChapter 15 Industrialization of Thai Nham: Fermented Pork or Beef in Industrialization of Indigenous Fermented Foods: 2nd ed. Revised and Expanded. Ed. By K.H. Steinkraus. Marcel Dekker. (2004)</p> <ul style="list-style-type: none"> <li>- GMP and HACCP System Management, King Mongkut's Institute of Technology Ladkrabang, (2007), Page 189</li> <li>- Microorganisms Management In Food Industry, National Food Institute, (2008), Page 184</li> </ul> <p><b>3. Teaching Subjects</b> -Industrial Microorganism Management (3 hrs./week) -Quality Assurance in Food Industry (3 hrs./week) -Microorganism in <i>Food Processing (3 hrs./week)</i></p>
3. Asst.Prof.Dr.Soraya kerdpiboon (Food Science and Technology)	B.S. (Fisheries) Kasetsart University, 1999 B.S. (Food Science) King Mongkut's Institute of	<b>Teaching Subjects</b> -Meat Products (3 hrs./week) -Fishery Products (3 hrs./week) -Food Industry Management

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
	Technology Ladkrabang, 2002 D.Eng. (Food Engineering) King Mongkut's University of Technology Thonburi, 2006	(3 hrs./week) -Seminar (1 hrs./week) -Thesis (3 hrs./week)

#### Lecturers

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
1. Assoc.Prof.Dr.Praphan Pinsirodom	B. Sc. (Chemistry), Chiang Mai University, 1988  M.Sc. (Food Science), Chulalongkorn University,1991  Ph.D. (Food Science), University of Wisconsin Madison, USA, 2000	<b>4. Selected Publications</b> Evaluation of oxidative stability and some quality characteristics of Chinese- style sausage as affected by the addition of roselle extract and different sweeteners. Effect of processing methods and storage conditions on the total phenolic content and antiradical properties of dehydrated banana. Changes of total polyphenol content and antioxidant activity of banana chips during processing and storage. Optimization of sucrose hydrolysis in sugarcane juice by invertase for the production of fructose syrup with high antioxidant activity.

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Study of formulation and production of okara chili paste.</p> <p>Production of frozen premature coconut strips</p> <p><b>2. Teaching Subjects</b></p> <p>Food Enzymology (3 hrs./week)</p> <p>Functional Food and Nutraceuticals (3 hrs./week)</p> <p>Thesis (3 hrs./week)</p>
<p>2. Assoc.Prof.Dr.Adisorn Swetwivathana</p>	<p>B.Sc. (Biology), Ramkhamhaeng University, 1986</p> <p>M.Sc. (Biology), Kasetsart University, 1990</p> <p>Ph.D. (Agricultural Science), Kyushu University, Japan, 2005</p>	<p><b>1. Selected Publications</b></p> <ul style="list-style-type: none"> <li>- Use of meat commercial LAB starter Cultures for Microbiological improvement of Nham</li> <li>- Role of garlic on the growth and lactic acid production of commercial meat starter cultures in Nham</li> <li>- Selection of bacteriocins producing strains from Thai fermented products</li> <li>- Application of bacteriocin-producing lactic acid bacteria as starter cultures to control microbiological quality of Thai fermented products.</li> </ul> <p><b>2. Teaching Subjects</b></p> <p>Lactobacillus's in Food Industry (3 hrs./week)</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		Advanced Food Science (3 hrs./week) Thesis (3 hrs./week)
3. Assoc. Prof. Dr. Wootthichai Narkruga	B.Sc. (Chemistry) Kasetsart University, 1979  M.Sc. (Food Science), Kasetsart University, 1983  Ph.D. Nat. Tech. (Food Science), Agricultural University of Vienna, Austria, 1990	<p><b>4. Selected Publications</b></p> <p>Unhasirikul,M., Naranong,N. and Narkruga,W. 2012. Reducing Sugar Production from Durain Peel by Hydrochloric Acid Hydrolysis. World Academy of Science, Engineering and Technology. 69:173-178.(in English)</p> <p>Unhasirikul,M., Narkruga,W. and Naranong,N. 2013. Sugar Production from Durain (Durio zibethinus Murray)Peel by Acid Hydrolysis. African Journal of Biotechnology. 12(33): 5244-5251.(in English)</p> <p>Unhasirikul,M., Narkruga,W. and Naranong,N. 2016. Ethanol production from from Durain (Duriozibethinus Murray)Peels by Saccharomyces cerevisiae. Asia Life Science 25(1):179-191.(in English)</p> <p><b>2. Books</b></p> <p>-Principle of Packaging</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		(revised version) -Cereal Technology -Carbohydrate <b>3. Teaching Subjects</b> Carbohydrate in Food (3.5 hrs./week) Advanced Food Processing (3 hrs./week) Starch Science and Technology (3.5 hrs./week) Advanced Food Science (3 hrs./week) Thesis (3 hrs./week)
4. Assoc.Prof.Dr.Sontisuk Teerachaichayut	B.Eng. (Agricultural Engineering), Chulalongkorn university, 19863  M.Eng. (Chemical Engineering, Chulalongkorn university, 1994  Ph.D. (Postharvest Technology), Kasetsart University, 2007	1. Selected Publications Non-destructive prediction of hardening pericarp disorder in intact mangosteen by near infrared transmittance spectroscopy. The methods of illumination and scanning for detecting internal disorders and quality of mangosteen by near infrared spectroscopy. Near Infrared Spectroscopy: Feasibility of visible and SW- NIR spectroscopy to detect gamboge disorder in mangosteen fruits.



Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Possibility of non-destructive sorting of mangosteen fruit with hard pericarp using multivariate analysis technique</p> <p>Prediction of translucent disorder from mangosteen juice using near infrared spectroscopy</p> <p>Internal Quality Assurance of mangosteen Near infrared spectroscopy (NIRS)</p> <p>2. Books</p> <ul style="list-style-type: none"> <li>-Momentum Transfer Heat and Mass, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Page 182</li> <li>-Food engineering Measurement and Instrumentation</li> </ul> <p>3. Teaching Subjects</p> <ul style="list-style-type: none"> <li>Instrumentation and Physicochemical Measurement For Foods (3 hrs./week)</li> <li>Food Industry Management (3 hrs./week)</li> <li>Thesis (3 hrs./week)</li> </ul>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
5. Asst.Prof.Dr.Yuporn Puechkamutr	B. Sc. (Food Science), Kasetsart University, 2000  M. Sc. (Food Engineering), Asian Institute of Technology, Thailand, 2531  D. Agri. Sci. (Food Science), Kyoto University, Japan, 2538	<b>1. Selected Publications</b> -The Benefits of Soybean in Food Industry -Antioxidants in Protein -The manufacturing and the Soybean Germination <b>2. Teaching Subjects</b> Food Protein (3 hrs./week) Food Additives (3 hrs./week) Advanced Food Science (3 hrs./week) Thesis (3 hrs./week)
6. Asst.Prof.Dr.Varipat Areekul	B.Sc. (Biology-Microbiology), Kasetsart University, 1989 M.Sc. (Biotechnology), Kasetsart University,1993 - M.Sc. (Food Science and Technology), The University of Georgia, USA, 2542 - Ph.D. (Food Science and Technology), The University of Georgia, USA, 2546	<b>1. Selected Publications</b> -Antimicrobial and Antioxidant Activity of Some Edible Local Plants -Bioactive Compounds of Edible Local and Wild Plants -Antioxidant Capacity and Effect of Several Breed of Rice Processing -Anti-rancidity Potential of Local Edible Plant -Risk Assessment of Chemical Hazard in Food -Laws and Food Safety Management -The Development and Investigation in the Production of Lodized Salt

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p><b>2. Teaching Subjects</b></p> <p>Advanced Food Science (3 hrs./week)</p> <p>Instrumentation and Physicochemical Measurement for Foods (3 hrs./week)</p> <p>Food Additive (3 hrs./week)</p> <p>Advanced Food Science (3 hrs./week)</p> <p>Thesis (3 hrs./week)</p>
<p>7. Asst.Prof.Dr.Aphacha Jindaprasert (Fermentation Technology in Food Industry)</p>	<p>B.Sc. (Biotechnology), Khon Kaen University, 1991</p> <p>M. Sc. (Biotechnology), chulalongkorn university,1994</p> <p>Ph.D. (Pharmaceutical Chemistry and Natural Products), Chulalongkorn university, 2008</p>	<p><b>1. Selected Publications</b></p> <p>Plant tissue culture for Breeding and producing Bioactive Compound</p> <p>Immobilization Bacteria Cell for Producing Cellulose</p> <p>Cloning and Expression of Polyketide Synthase of Plant</p> <p>Development of PCR technique for classification of lactic acid bacteria extracted from Thai fermented foods</p> <p>Detection and classification of microbial strains in food Biomolecular techniques</p> <p><b>2. Teaching Subjects</b></p> <p>Lactic Acid Bacteria in Food Industry (3 hrs./week)</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		Current Issues in Food Science (3 hrs./week) Thesis (3 hrs./week)
8. Asst.Prof.Dr. Tongchai Puttongsiri (Food Science and Technology)	<p>B.Sc. (Agro-Industry Technology), King Mongkut's Institute of Technology Ladkrabang, 1999</p> <p>M.Sc. (Food Science), King Mongkut's Institute of Technology Ladkrabang, 2002</p> <p>Ph.D. (Food Science), King Mongkut's Institute of Technology Ladkrabang, 2010</p>	<p><b>1. Selected Publications</b></p> <p>Herbal Noodle.</p> <p>    Preservation of Fresh Rice Noodle Using Hurdle Technology.</p> <p>    Changes in ascorbic acid, total polyphenol, phenolic acids and antioxidant activity in juice extracted from coated kiew wan tangerine during storage.</p> <p>    Formulation of Chitosan-Oleic Acid Coating for Kiew Wan Tangerine by Response Surface Methodology.</p> <p>    Optimization of tray drying condition in squid ink powder production.</p> <p>    Impact of chitosan concentrations on the reduction of initial microorganisms in Dried Sepat Siam (<i>Trichogaster pectoralis</i>)</p> <p>    Moisture Content and Physical Properties of Instant Mashed Potato.</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<b>2. Teaching Subjects</b> Experimental Designs in Food Research (3 hrs./week) Thesis (3 hrs./week)
9. Asst.Prof.Dr.Naphatrapi Luangsakul (Food Science and Technology)	B.Sc. (Food Technology) Chulalongkorn University,1992 M.Sc. (Food Technology), Chulalongkorn University,2001 C (Food Technology), Chulalongkorn University,2010	<b>1. Selected Publications</b> <p>The effects of the amount and type of wheat flour and mixing method on the quality of fortune cookies.</p> <p>Effects of dough sheeting, dough weight and proofing temperature on dough and bread properties using no-time dough method.</p> <p>Composition and physicochemical properties of starch isolated from Chinese water chestnut (Eleocharisdulcis Trin.).</p> <p>Pasting properties of Chinese water chestnut (Eleocharisdulcis Trin.) starch and textural properties of its gel.</p> <p>Development of freeze-dried snack from Chinese water chestnut (Eleocharisdulcis Trin.).</p> Ph.D. (Food Science) Faculty

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>of Agro-Industry, KMITL</p> <p>Characteristics of dough and Chinese steamed bun fermented from Thai traditional fermentation starter (Loog-Pang) produce in the northern part of Thailand.</p> <p>Resistant starch content and physicochemical properties of legume flour.</p> <p>Effects of selected gluten-free flours on the qualities of gluten-free cookies</p> <p>Effects of the amount of Chinese steamed bun starter dough (CSB-SD) and the activation time on dough and bread properties.</p> <p>Effects of various processing techniques on the in vitro starch digestibility in Pigeon Pea, Red kidney bean and Chinese water chestnut starch</p> <p>Characteristics of the bread made from rice and legume flours substituted to wheat flour.</p> <p>Comparison of in vitro starch digestibility between legumes, tubers, and cereals.</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Effects of oil types on the quality of cake for vegans.</p> <p><b>2. Teaching Subjects</b> Thesis (3 hrs./week)</p>
<p>10. Asst.Prof.Dr.Chompunut Sihsobhon (Food Science and Technology)</p>	<p>B.Sc. (Food Science), Kasetsart University, 1987</p> <p>M.Sc. (Agro-Industrial Product Development), Kasetsart University, 1993</p> <p>Ph.D. (Agro-Industrial Product Development, Kasetsart University, 2013</p>	<p><b>1. Selected Publications</b> The Study of Optimum Condition for Preparing Konjac Gel in Practical Use</p> <p>The development of Brown Rice congee in recipe and manufacturing</p> <p><b>2. Books</b></p> <ul style="list-style-type: none"> <li>-The development of mixed veggie and fruit Milkshake powder in recipe and manufacturing</li> <li>-Powdered milk: Herbal flavor</li> <li>-Cubed Hot Chili Paste Product</li> <li>-The Development of Mango Dipping Custard in Product Spread</li> <li>- The substitution of wheat flour with Chinese water chestnut in Instant Pasta</li> <li>-Cubed Yen-Ta-Four (Authentic Thai-style noodle soup) Sauce and Study the possibility of marketing in</li> </ul>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Thai Product</p> <p>The development of Kimchi Sauce, a traditional Korean side dish.</p> <p>The development of instant Thai-rice-flour noodles Products</p> <p><b>3. Teaching Subjects</b> Advanced Food Product Development (3 hrs./week) Thesis (3 hrs./week)</p>
<p>11.Asst.Prof.Dr. Soisuda Pornpukdeewattana (Fermentation Technology in Food Industry)</p>	<p>B.Sc. (Biotechnology), Kasetsart University, 1999 M.Sc. (Biotechnology), Kasetsart University, 2003 Ph.D. (Food Science) University of Nottingham, UK, 2012</p>	<p><b>1. Selected Publications</b></p> <p>The Development of Ethanol Fermentation of Cassava by prepared with additives and fortified with coconut water by fermentation Saccharomyces cerevisiae SC90</p> <p>Improvement of ethanol production performance of Saccharomyces cerevisiae SC90 inducing by sodium chloride</p> <p>Effect of zinc ions on the production of ethanol from</p>



Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>High concentration sugar with Saccharomyces cerevisiae SC90</p> <p>The Development of Production of vinegar from Upland rice and its Benefits</p> <p>Adaptation of commercial yeast Saccharomyces cerevisiae SC90 to tolerate inhibitors generated during cassava pulp hydrolysis for bioethanol production</p> <p><b>2. Books</b> Alcohol industry</p> <p><b>3. Teaching Subjects</b> Current Issues in Food Science (3 hrs./week) Thesis (3 hrs./week)</p>
<p>12. Asst.Prof.Dr.Pramoun Srikalong (Food Process Engineering)</p>	<p>B.Sc. (Biotechnology), King Mongkut's Institute of Technology Ladkrabang, 1993</p> <p>M.Sc. (Biotechnology), King Mongkut's Institute of Technology Ladkrabang, 1995</p> <p>Ph.D. (Food Science and Technology) Chiang Mai University, 2007</p>	<p><b>1. Selected Publications</b> Reducing discoloration of potato chips</p> <p>Effect of physical factors on the conductivity of the case study of Liquid food with high viscosity and low viscosity</p> <p>Effects of irradiation on the quality of potato and potato</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>chips</p> <p>The role of community participation in process development before and after harvesting sea crab to increase value and Production standards</p> <p><b>2. Teaching Subjects</b> Shelf Life Food Safety Related (3 hrs./week) Thesis (3 hrs./week)</p>
13. Dr.Rachit Suwapanich	<p>B.Sc. (Biology), Chiang Mai University, 1990</p> <p>M.Sc. (Postharvest Technology), Chiang Mai University, 1993</p> <p>Ph.D. (Postharvest Technology), Chiang Mai University, 2007</p>	<p><b>1. Selected Publications</b> Effect of heat on the thermal properties of mangoes Detection of Chilling Injury in Mango using NIR</p> <p><b>2. Teaching Subjects</b> Shelf-Life-Evaluation of Food Products (3 hrs./week) Thesis (3 hrs./week)</p>
14. Asst.Prof.Dr.Sitthipong Nalinanon	<p>B.Sc. (Food Science and Technology), Walailak University, 2002</p> <p>M.Sc. (Food Science and Technology), Prince of Songkla University, 2006</p> <p>Ph.D. (Food Science and Technology), Prince of Songkla University, 2010</p>	<p><b>1. Selected Publications</b> Purification and biochemical properties of pepsins from the stomach of skipjack tuna (<i>Katsuwonus pelamis</i>) Collagens from the skin of arabesque greenling (<i>Pleurogrammus azonus</i>) solubilized with the aid of acetic acid and pepsin from</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>albacore tuna (<i>Thunnus alalunga</i>) stomach.</p> <p>Type I collagen from the skin of ornate threadfin bream (<i>Nemipterus hexodon</i>): Characteristics and effect of pepsin hydrolysis</p> <p>Functionalities and antioxidant properties of protein hydrolysates from the muscle of ornate threadfin bream treated with pepsin from skipjack tuna. <i>Food Chemistry</i>. 124(4), 1354-1362</p> <p>Nalinanon, S., Benjakul, S. and Kishimura, H. 2011.</p> <p>Characterization of collagen from the skin of unicorn leatherjacket (<i>Aluterus monoceros</i>) solubilized by albacore tuna pepsin.</p> <p>Myoglobin-mediated lipid oxidation in fish muscle.</p> <p>Cold-adapted structural properties of trypsins from walleye pollock (<i>Theragra chalcogramma</i>) and Arctic cod (<i>Boreogadus saida</i>). Simple Preparation of Pacific Cod Trypsin for</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Enzymatic Peptide Synthesis. Mackerel trypsin purified from defatted viscera by supercritical carbon dioxide. Structural properties of trypsin from cold-adapted fish, arabesque greenling (<i>Pleurogrammus azonus</i>).</p> <p>Type I collagen from the skin of ornate threadfin bream (<i>Nemipterus hexodon</i>): Characteristics and effect of pepsin hydrolysis</p> <p><b>2. Teaching Subjects</b></p> <p>Techniques in Scientific Communication (1 hrs./week)</p> <p>Current Issues in Food Science (2 hr./week)</p> <p>Thesis (3 hrs./week)</p>
15. Dr.Panadda Nonthanum	<p>B.Sc. (Agro-Industry), King Mongkut's Institute of Technology Ladkrabang,2000</p> <p>M.Eng. (Food Engineering),King Mongkut's University of Technology Thonburi, 2004</p> <p>Ph.D. (Food Science) University of illinois at Urban-Champaign, USA, 2013</p>	<p>1. Selected Publications</p> <p>Effect of pH and ethanol content of solvent on rheology of zein solutions.</p> <p>Effect of <b>Y</b>-zein on the rheological behavior of concentrated zein solutions.</p> <p>Effect of Casting Surface on Hydrophobicity of Zein films.</p> <p>Surface images and physical /properties correlation of</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>sirloin steak by pearson's correlation and multiple linear regression analysis. International</p> <p>A. High nutritious germinated brown rice and hang rice produced from different rice cultivars. Rheological characterization of zein solutions containing <math>\gamma</math>-zein.</p> <p><b>2.Teaching Subjects</b></p> <p>Instrumentation Designs in Food Research (3 hrs./week)</p> <p>Food Gels and Colloids (3 hrs./week)</p> <p>Seminar (1 hr./week)</p> <p>Thesis (3 hrs./week)</p>
16. Dr.Wiramsri Sripochanart	<p>B.Sc. (Chemistry), Silpakorn University, 1999</p> <p>M.Sc. (Biochemistry), chulalongkorn university, 2003</p> <p>D. Eng. (Chemical Engineering), Thammasat University, 2009</p>	<p>1. Selected Publications</p> <p>Effect of sodium lactate on inhibition of Clostridium perfringens spores in sous-vide model (SVM) broth.</p> <p>The optimization of <math>\beta</math>-cyclodextrin production from gelatinized cassava starch.</p> <p>Effect of amino acid requirements on the growth and lactic acid production of <i>Pediococcus acidilactici</i></p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		culture. <b>2. Teaching Subjects</b> Thesis (3 hrs./week)
17. Dr.Sawamineen Nualkaekul	B.Sc. (Agriculture), Kasetsart University,2001  M.Sc. (Agro-Industrial Product Development), Kasetsart University, 2004  Ph.D. (Food and Nutritional Sciences), University of Reading (UK), 2012	<b>1. Selected Publications</b> Survival of Lactobacillus plantarum in model solutions and fruit juices. Investigation of the factors influencing the survival of Bifidobacterium longum in model acidic solutions and fruit juices Chitosan coated alginate beads for the survival of microencapsulated Lactobacillus plantarum in pomegranate juice. Survival of freeze dried Lactobacillus plantarum in instant fruit powders and reconstituted fruit juices. Survival of Probiotics in Fruit Juices. Srinakharinwirot Influence of encapsulation and coating materials on the survival of Lactobacillus plantarum and Bifidobacterium longum in fruit juices

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>Improving survival of probiotic bacteria using bacterial poly-<math>\gamma</math>-glutamic acid.</p> <p>Effect of Packaging Films on the Quality and Storage Stability of Cheese Shake Biscuits made from Germinated Hom Nin Brown Rice Flour with Sugar Reduced Pineapple Paste Filling.</p> <p>Development of pineapple paste formulation using sweetener,</p> <p>Development of a fat reduced cheese shake biscuit from germinated Homnin brown rice flour.</p> <p>“Survival of Lactobacillus plantarum in model solutions and fruit juices”</p> <p>Efficiency of coating material on survival of Lactobacillus plantarum and Bifidobacterium longum in fruit juices during refrigeration storage”</p> <p>Effect of packaging films on the quality and shelf stability of cheese shake biscuits made from</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>germinated Homnin brown rice flour with sugar reduced pineapple paste filling.</p> <p>Development of a calorie reduced cheese shake biscuit from germinated Homnin brown rice flour .</p> <p>Development of pineapple paste formulation using sweetener.</p> <p><b>2.Teaching Subjects</b></p> <p>Current Issues in Food Science (3 hrs./week)</p> <p>Thesis (3 hrs./week)</p>
18. Dr.Pajaree Ingkasupart	<p>B.Sc. (Biotechnology) Kasetsart University, 2008</p> <p>M.Sc. (Food and Life Science), 2013</p> <p>Ph. D. (Food and Life Science), Inje university South Korea, 2016</p>	<p><b>1. Selected Publications</b></p> <p>Antioxidant and hepatoprotective effects of procyanidins from wild grapes (<i>Vitis amurensis</i>) seeds in ethanol-induced cells and rats.</p> <p>Inhibitory effect of water extract from rice bran due to cAMP-dependent phosphorylation of VASP (Ser157) on ADP-induced platelet aggregation.</p> <p>Water extract from rice bran</p>



Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>fermented with Lactobacillus plantarum  Hong inhibits thromboxane A2 production associated  microsomal enzyme activity in human platelets  Inhibitory effects of rice bran water extract  fermented Lactobacillus plantarum due to cAMP-dependent phosphorylation of VASP (Ser157) on human platelet aggregation.  Effects of rice bran extracts fermented with Lactobacillus plantarum on neuroprotection and cognitive improvement in rat model of ischemic brain injury.</p> <p><b>2. Teaching Subjects</b>  Food Additives (3 hrs./week)  Thesis (3 hrs./week)</p>
19. Asst.Prof.Dr.Pawinee Deetae	B.Sc. (Biotechnology), Mahidol University, 2000  M.Sc. (Biotechnology), Mahidol University, 2003	<p><b>1. Selected Publications</b>  2017. Ultrasonic extraction, antioxidant and anti-glycation activities of polysaccharides from Gynura divaricata leaves. Chiang</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
	Ph.D. (Food Science) Agro-Paris Technology, France, 2009	<p>Mai Journal of Science Vol 44, pp. 144-156.</p> <p>2017. Occurrence of biogenic amines present in Thai soy sauces and soy bean pastes and their health concern. International Food Research Journal Vol. 42, pp 110-117.</p> <p>2016. Analysis of intraspecific genetic variation, antioxidant and antibacterial activities in Zingiber zerumbet. International Food Research Journal, 23: 1552-1557.</p> <p>2015. Apolar Radical Initiated Conjugated Autoxidizable Triene Assay: Effects of Oxidant Locations on Antioxidant Capacities and Interactions. Journal of Agricultural and Food Chemistry, 63:7546-7555</p> <p>2015. Determination of the effects of adding milk and sugar on the antioxidant capacity of oolong tea by chemical and cell culture-based antioxidant assays. Chiang Mai Journal of Science, 42: 699-711.</p> <p><b>2. Teaching Subjects</b> Chemical and Food Flavour</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		Technology (3 hrs./week) Thesis (3 hrs./week)
20. Assoc.Prof.Dr.Kittiphong Huangrak	<p>B.Sc. (Food technology), Chulalongkorn University,1984</p> <p>M.Sc. (Food technology), Chulalongkorn University, 1986</p> <p>Ph.D. Nat. Tech. (Food Science), Agricultural University of Vienna, Austria, 1996</p>	<p><b>1. Selected Publications</b></p> <p>Yun, Pheakdey, Thamakorn, P., Nokkoul, R.,Suwapanich, R., and Huangrak, K. 2015. Antioxidant activity and bioactive compounds of freeze dried product from Thai upland rice grass juice. In Proceedings of the 17th Agro Industrial Conference “Food Innovation Asia Conference Vienna, Austria, 2539 2015”. June 18-19 2015, BITEC, Bangkok, Thailand.</p> <p>Yun, Pheakdey, Thamakorn, P., Nokkoul, R., and Huangrak, K. 2016. Maltodextrin concentration effect on the characteristics of freeze-dried powder from Thai upland rice grass juice. In Proceedings of The International Conference on Food and Applied Bioscience 2016. February 4-5, 2016, The Empress Hotel, Chiangmai, Thailand</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p><b>2. Books</b></p> <ul style="list-style-type: none"> <li>-Bakery Industry</li> <li>-Hazard Analysis and Critical Control Points</li> <li>-Vegetables and Fruits</li> <li>-Food Processing</li> </ul> <p><b>3. Teaching Subjects</b></p> <p>Thesis (3 hrs./week)</p>
<p>21. Asst.Prof.Dr.Kallayanee Tengpongsathon (Food Science and Technology)</p>	<p>B.Sc. (Food Technology), Khon Kaen University, 1992</p> <p>M. Sc. (Food Science), Kasetsart University,1997</p> <p>Ph.D. (Food Technology), Khon Kaen University, 2007</p>	<p><b>1. Selected Publications</b></p> <p>Application of the FactoMineR program of the program R for analyzing the main element of the assessment sensory quality data</p> <p>Application of R Program for Analyzing Statistical Data in Product Development research</p> <p>Effects of Fat Types and Proportion of Fat on Pre-ingredients Emulsion to The Characteristics of Meat Sausages</p> <p>Chart of Thai consumer preferences for products</p> <p>Consumer preference of rice-</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>based products: cross cultural study between Thailand and Australia.</p> <p><b>2. Teaching Subjects</b>  Advanced Food Product Development (3 hrs./week)  Experimental Designs in Food Research (3 hrs./week)  (1 hr./week)  Thesis (3 hrs./week)</p>
22. Dr.Kittichai Banjong	<p>B.Sc.(Agriculture), Kasetsart University, 1982</p> <p>M.Sc (Food Engineering) Asian Institute of Technology, Thailand, 1986</p> <p>Dr. Tech. Sci. (Food Engineering) Asian Institute of Technology, Thailand, 1990</p>	<p><b>1. Selected Publications</b>  Temperature profile prediction on three shapes of banana slices during microwave heating.</p> <p>Comparison of Characteristics and Yield of Young Sugar Palm Peel from Recovered Ethyl Alcohol Substitution from Ethylalcohol 95% in The Precipitation and Washing Process</p> <p>The measurement of Hardness canned cooked rice</p> <p>Using physical property and Quality Index of cultivated banana as an ingredient in</p>

Name-Surname	Qualifications (subject field) Academic year	Academic Contribution
		<p>industry</p> <p>A hot-wire method based thermal conductivity measurement</p> <p>Determination of the rate of extraction of polyphenols in Rooibos Tea</p> <p><b>3. Teaching Subjects</b></p> <p>Instrumentation and Physicochemical Measurement for Food (3 hrs./week)</p> <p>Experimental Designs in Food Research (3 hrs./week)</p> <p>Food Industry Management (3 hr./week)</p> <p>Thesis (3 hrs./week)</p>

### Special Lecturers

Name-Surname	Qualifications (subject field) University	Work Place
1.Prof.Dr. Casimir C. Akoh	Ph.D.(Food Chemistry /Food Biochemistry)	Department of Food Science and Technology, The University of Georgia, USA
2. Prof. Dr. Lilis Nuraida	Ph.D. (Food Science and Technology)	Department of Food Science and Technology, Bogor Agricultural University, Indonesia

Name-Surname	Qualifications (subject field) University	Work Place
3. Prof.Dr. Jeong-Hwa Hong	Ph.D.(Food Science and Technology)	Department of Smart Foods and Drugs, Inje University, Korea Department of Food Science, Louisiana State University, USA
4. Prof.Dr. Witoon Prinyawiwatkul	Ph.D. (Food Science)	Department of Food Science, Louisiana State University, USA
5. Assoc. Prof. Dr. Shin Yasuda	Ph.D.(Agricultural Science)	Tokai University, Japan

### Course Description

#### Core Courses

**3 credits**

08117111 SUSTAINABLE FOOD PROCESSING

3 (3-0-6)

Prerequisite: None

Concept and applied research in sustainable food processing i.e., meat processing, dairy processing, seafood processing and others processed food. Sustainable food manufacturing operation i.e. packaging system and its development, cleaning and sanitation in food industry, zero-waste management, energy consumption and reduction strategies in food processing, clean technology, carbon footprint, water consumption strategies in food processing.

08117112 TECHNIQUES IN SCIENTIFIC COMMUNICATION

2(2-0-4)

Prerequisite: None

Overview of techniques for finding out science information, presentation of oral, written and poster for scientific presentation, emphasis on oral presentation delivery, content development and organizing and good audience perspective by using appropriate computer software, integration the knowledge to solve the problem or development in food science.

#### Seminar Courses

**2 credits**

08218303 SEMINAR IN RESEARCH PROGRESS 1

1(0-2-0)

Prerequisite: None

Serial presentations of dissertation research.

08218304 SEMINAR IN RESEARCH PROGRESS 2 1(0-2-0)  
Prerequisite: None  
Serial presentations of dissertation research.

**Elective Courses** **9 credits**

08218112 ADVANCED FOOD TOXICOLOGY 3(3-0-6)  
Prerequisite: None  
Chemical hazards in foods including methods for detection, safety evaluation of food-borne chemicals, biological response to food-borne toxins, mechanisms of toxic action, and naturally occurring food-borne toxicants.

08218113 BIOCHEMICAL METHODS FOR FOOD RESEARCH 3(3-0-6)  
Prerequisite: None  
Biochemical techniques and instrumentations in food research such as protein purification and characterization, enzymology, and PCR analysis.

08218118 GENETIC ENGINEERING IN FOOD INDUSTRY 3(3-0-6)  
Prerequisite: None  
Techniques and applications of genetic engineering to improve food quality, nutritional value and functional characteristics of food materials, food processing, shelf life, food quality control and food safety, regulations for the production of genetic modified foods and current impacts of recombinant DNA technology on food quality.

08218120 PHASE TRANSITION IN FOODS 3(3-0-6)  
Prerequisite: None  
Phase and state transitions; the equilibrium state, types of transitions, transitions and water. Phase and state transitions in foods; melting and crystallization of sugar, starch and lipids. Glass transitions theory. Transitions and food processing; dehydration and powder handling, confectionery and extrusion, food freezing.

08218122 ADVANCED FOOD PACKAGING 3(3-0-6)  
Prerequisite: None  
Influence of factors on changes in food, packaging materials and characteristics for package formation, interaction between food and packaging material and its migration to food, packaging technology for food, fresh and processed foods, aiming to preserve the quality



and shelf life of food such as modified atmosphere packaging (MAP), edible film coating, and nanotechnology relevant to food packaging.

08218123      ADVANCED INDUSTRIAL FERMENTATION TECHNOLOGY      3(3-0-6)

Prerequisite: None

Advance and developments in technology of fermentation emphasizing industrial production, factors concerning in production expanding to the industrial scale, process management as non-waste concept, the improvement and adaptation of industrial microorganisms, substrate instrumentation and control, as well as the recovery and purification of fermentation products.

08218125      FOOD RHEOLOGY      3(3-0-6)

Prerequisite: None

Mechanical properties of foods, applications of rheology principles to food materials, relationships between texture and microstructure, instrumental measurement systems for different types of foods, interpretation of force-deformation diagrams, texture modification, texture profile analysis.

08218126      FUNCTIONAL AND MEDICAL FOOD      3(3-0-6)

Prerequisite: None

Definition and importance of functional and medical food, Bioactive in food component for prevention and management of diabetes, obesity, cancer, cardiovascular disorder and other non-communicable diseases (NCDs). Modern approach of product development including efficacy, biomarker analysis, preclinical screening, clinical trial and epidemiological studies.

08218127      FOODONICS      3(3-0-6)

Prerequisite: None

Definition and the development of variety of –omics technology in improvement of human nutrition, for example; functional genomics, proteomics, and metabolomics, a variety of omics sub-disciplines epigenomics, lipidomics, interactomics, metallomics and diseasomics, the application and integration in optimization of consumer's health and wellbeing.

08218128      MICROBIOLOGICAL TECHNOLOGY FOR FOOD FLAVOR PRODUCTION      3(3-0-6)

Prerequisite: None

Market of flavor compounds used in foods, contributions of microbial metabolisms to flavor developments in foods, microbial biotechnology for flavor productions flavor enhancements and flavor modifications, flavor compounds produced from microbial biotechnology means in the markets and their applications in food products.

**Dissertation**      **48 credits**

**Plan 1.1**

08218413      THESIS      48(0-144-0)

Prerequisite: None

Conduct research experiment in food science under supervision of the advisor.  
Progress report should be done regularly.

**Dissertation**      **36 credits**

**Plan 2.1**

08218414      THESIS      36(0-108-0)

Prerequisite: None

Conduct research experiment in food science under supervision of the advisor.  
Progress report should be done regularly.