Bachelor of Food Technology with Honours

ACADEMIC HANDBOOK

School of Industrial Technology

Universiti Sains Malaysia

indtech.usm.my

UNDERGRADUATE PROGRAM

IFT

IFT APPROVED FOR

2020-2027

Academic Handbook
Bachelor of Food Technology with Honours
Academic Calendar 2026/2027

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Published by: School of Industrial Technology, Universiti Sains Malaysia

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Vision and Mission

Universiti Sains Malaysia

Vision

Transforming Higher Education for a Sustainable Tomorrow

Mission

USM is a pioneering, transdisciplinary research intensive university that empowers future talents and enables the bottom billions to transform their socio-economic well-being

Vision and Mission

School of Industrial Technology

Vision

World class centre in technological innovation for a sustainable tomorrow

Mission

1. To be the prime education provider of technologists who are competent, capable of independent thinking, possess communication and analytical skills, and able to fulfil the needs in various industries and socio-economic development.

2. To pursue cutting-edge research in the fields of Food Technology, Bioresource Technology, Environmental Technology, and Bioprocess Engineering Technology.

3. To contribute to the well-being of the community through sustainability-led dynamic transdisciplinary academic programmes, research innovation, teamwork, and continuous improvement.

Niche Research Area

School of Industrial Technology

Sustainable Materials, Processing, and Energy Technologies

History

School of Industrial Technology

1973	The establishment of the School of Applied Sciences, offering the Bachelor of Applied Science programmes in Electronic Science and Technology, Food Science and Technology, and Polymer Science and Technology.
1984	The name of the School was changed to the School of Engineering Sciences and Industrial Technology. Hence, the curricula were amended to Bachelor of Engineering (B. Eng) and Bachelor of Technology (B. Tech) to meet the requirement of engineering and industrial technology courses.
1986	The School was split into: - School of Electrical and Electronic Engineering - School of Materials and Mineral Resources Engineering - School of Industrial Technology School of Industrial Technology offered Bachelor of Technology programmes in Food Technology, Polymer Science and Technology, Quality Control & Instrumentation, and Wood, Paper and Coatings Technology.
2001	Polymer Technology and Quality Control & Instrumentation programmes were upgraded into: - Polymer Engineering programme - Mechatronic Engineering programme
1999	Environmental Technology programme was introduced by School of Industrial Technology.
2002	Wood, Paper and Coatings Technology programme was renamed Bioresource, Paper and Coatings Technology programme.
2008	Bioprocess Technology programme was introduced by School of Industrial Technology.
2018	Master of Science (Environmental Science) programme was introduced by School of Industrial Technology.
2020	Bioresource, Paper and Coatings Technology programme was renamed Bioresource Technology programme.
2022	Bioprocess Technology programme was changed to Bioprocess Engineering Technology programme.
2025	Master in Bioprocess Technology programme was introduced by School of Industrial Technology.

Management

School of Industrial Technology

DEAN

Assoc. Prof. Dr. Yusri Yusup

DEPUTY DEAN

Assoc. Prof. Dr. Uthumporn Utra @ Sapina Abdullah
(Academic, Career & International)

Assoc. Prof. Dr. Lee Chee Keong
(Research, Innovation & Industrial – Community Engagement)

PROGRAMME CHAIRMAN

Dr. Maizura Murad
(Food Technology)

Ts. Dr. Azniwati Abd Aziz
(Bioresource Technology)

Assoc. Prof. Dr. Syahidah Akmal Muhammad
(Environmental Technology)

Ts. Dr. Siti Baidurah Yusoff
(Bioprocess Technology)

Deputy Registrar	Senior Assistant Registrar	Senior Research Officer	Senior Science Officer	Senior Science Officer
Mdm. Nooraida Mad Naser	**Mdm. Khairun Nisa Ismail** K.B.; P.A.	**Ts. Dr. Che Ku Abdullah Che Ku Alam**	**Mr. Jeffiz Ezuer Shafii**	**Mr. Mohd Syukri Baharudin**

Academic Programme

The School of Industrial Technology offers the following bachelor degrees:

- Bachelor of Food Technology with Honours
- Bachelor of Bioresource Technology with Honours
- Bachelor of Environment Technology with Honours
- Bachelor of Bioprocess Engineering Technology with Honours

Acceptance to any of the above programmes is subjected to selection and entry qualification. Most of the first year courses consist of basic science courses in Chemistry, Mathematics, Physics, and Computer. From level 200, all students are required to enrol for courses relevant to their respective programmes up to level 300 (Bioresource and Environmental Technologies) or 400 (Food and Bioprocess Engineering Technologies), whereby they are required to conduct one final year research project.

Students are also required to undergo industrial training in various industries relevant to their study programme for 12 (Food, Bioresource, and Environment Technologies) or 24 (Bioprocess Engineering Technology) weeks. This training is aimed at exposing the students to actual working practice and atmosphere of the industry.

Food Technology

This program is the earliest program offered by the School of Industrial Technology. This programme has undergone continual curriculum evolution since it was offered and managed to obtain an approval as an accredited undergraduate food science programme by the Institute of Food Technologists (IFT) from 2015 until present. Our Food Technology programme covers all the 11 standards set by the IFT, i.e. food chemistry, food microbiology, food safety, food engineering and food processing, sensory science, quality assurance, food laws and regulations, data and statistical analysis, critical thinking and problem solving, food science communication, and professionalism and leadership.

The curriculum is designed in such a way to train and produce competent graduate equipped with the 21st century skills to serve and to lead food industries as well as the government sectors. Courses in the curriculum for Food Technology program are spread over four years of study, which emphasise the logical sequence of related course while ensuring that teaching – learning activities are equally distributed throughout the study period. Students have opportunities to advance knowledge and acquire lifelong learning skills beyond the four-wall through a variety of experiential education sub-programs such as the ASEAN International Mobility for Students (AIMS), the biennial MIFT National Food Science and Technology Competition, short-term certificate programs, etc.

Programme Educational Goal & Objectives

The goal of the Bachelor of Food Technology with Honours degree programme is to produce graduates who have specialised expertise, solid knowledge, critical thinking, creative, research skills in the field of Food Technology to meet the employable needs of the country in various related industries or agencies and graduates and able to lead the community for sustainable national development.

Therefore, the Bachelor of Food Technology with Honours degree programme is designed to produce practitioners:

- Who possesses knowledge in the related and broad areas of study in Food Technology and able to provide services and solutions to industry-related issues.
- who adopts relevant procedures and utilises digital/information technologies and quantitative information for effective decision-making in Food Technology practice.
- who leads collaborations with others as an effective leader and communicates information professionally to stakeholders in Food Technology-related fields.
- who adheres to ethical, social, cultural, and professional codes of practice while demonstrating an entrepreneurial mindset and engaging in lifelong learning for personal development and career advancement in Food Technology and related industries.

Mentor-Mentee System & Counselling Service

The mentors are appointed among the academic staff of the school who provide assistance and guidance to students, mainly in academic matters. However, the school has established an open mentor system, whereby probation students are free to see any of the mentors. Nevertheless, probation students are recommended to discuss academic-related problems with mentors from their own programme.

The mentors appointed are as listed below:

No.	Name	Room No.	Phone Extension	E-mail Address
1.	Prof. Dato' Dr. Azhar Mat Easa	A606	6394	azhar@usm.my
2.	Assoc. Prof. Dr. Cheng Lai Hoong	238	5209	lhcheng@usm.my

Programme Learning Outcomes

At the end of the programme, students will be able to:

1. Analyse advanced and comprehensive theoretical and technical knowledge in the field of Food Technology with integrity and responsibility (Knowledge).
2. Evaluate and solve complex problems using critical, creative and innovative thinking in Food Technology within ethical and sustainable considerations (Thinking Skill and Scientific Approach).
3. Perform technical and practical skills proficiently in professional Food Technology practices with commitment to quality and societal well-being (Technical Skill, Practical Skill, Psychomotor).
4. Demonstrate effective interpersonal and social responsibility skills in diverse team settings with empathy and respect for others (Social and Responsibility Skill).
5. Communicate ideas and information effectively through verbal, non-verbal and written forms to diverse stakeholders in professional contexts with clarity, professionalism and ethical awareness (Communication Skill).
6. Utilise digital and information technology skills in professional and societal contexts responsibly and adaptively in a rapidly evolving environment (Digital Skill).
7. Apply quantitative and analytical skills to support decision-making in professional and societal contexts with accuracy, accountability and fairness (Numeracy Skill).
8. Lead and collaborate effectively in teams with autonomy and accountability in professional environments with fairness, inclusivity and respect for diverse perspectives (Leadership Skill).
9. Manage and reflect information and lifelong learning skills for continuous personal and professional development with perseverance and self-awareness (Lifelong Education and Information Management).
10. Apply entrepreneurial knowledge and skills to develop innovative and sustainable solutions in professional and societal contexts with social responsibility (Management and Entrepreneurship Skill).
11. Adhere and integrate ethical principles and professional practices in decision-making within professional and societal contexts with strong moral responsibility (Professionalism, Value, Attitude and Ethics).

IFT Approved Undergraduate Programme

Since 1939, the Institute of Food Technologists (IFT) has been a forum for passionate science of food professionals and technologists to collaborate, learn, and contribute all with the goal of inspiring and transforming collective scientific knowledge into innovative solutions for the benefit of all people around the world. As a scientific community grounded in purpose, IFT feeds the minds that feed the world.

IFT Vision

A world where science and innovation are connected and universally accepted as essential to improving food for everyone.

IFT Mission

Connecting global food system communities to promote and advance the science of food and its application

To support the IFT mission and vision, the IFT Higher Education Review Board (HERB) rigorously assesses undergraduate food science and technology programmes that meet its high IFT Undergraduate Education Standards for Degrees in Food Science and Technology. The Bachelor of Food Technology with Honours programme offered by the School of Industrial Technology, USM is the first undergraduate programme in Malaysia that is IFT-approved, from 2015 until present. This means that the programme is internationally recognised and will provide graduates with many global career opportunities.

The IFT Programme Goals serve as an overarching expectation of an IFT-approved academic programme. The Standards encompass the academic content and skills under the four IFT Programme Goals. The Standards provide the framework to assess the Essential Learning Outcomes (ELOs). ELOs are measurable statements that describe the knowledge or skills students should acquire by the end of a particular assignment, class, course, or programme. The academic programme must require specific courses and learning activities that provide students with a deep understanding of the critical principles, concepts, and skills in the content areas of Food Science or Food Technology.

Under the IFT Approved Undergraduate Programme, the Bachelor of Food Technology with Honours degree programme is designed to produce:

- Graduates are competent in core areas of food science.
- Graduates can integrate and apply their knowledge.
- Graduates are proficient communicators.
- Graduates demonstrate professionalism and leadership skills.

No.	Standards	Descriptions
1	**Food Chemistry**	The structure and properties of food components (water, carbohydrates, protein, lipids, other components and food additives); the chemistry of changes occurring during processing, storage, and utilisation.
2	**Food Microbiology**	Microorganisms in food including beneficial, pathogenic, and spoilage; the influence of the food system on their growth, survival, and control.
3	**Food Safety**	Hazards (physical, chemical, biological) associated with foods and the food system; their transmission and control.
4	**Food Engineering and Processing**	Food engineering principles; food preservation and processing; packaging materials and methods; cleaning and sanitation; water and waste management.
5	**Sensory Science**	Analytical and affective methods of assessing sensory properties of food.
6	**Quality Assurance**	Principles of food quality control and assurance.
7	**Food Laws and Regulations**	Government regulations required for the manufacture and sale of food products.
8	**Data and Statistical Analysis**	Collection, analysis, interpretation, and presentation of data.
9	**Critical Thinking and Problem Solving**	Scientific reasoning through uncertainty in scientific and technical situations.
10	**Food Science Communication**	Oral and written communication.
11	**Professionalism and Leadership**	Organisation and project management; skills necessary to work and interact with individuals from diverse backgrounds.

Programme Requirements

Course Code Classification	Normal Programme	Min. Total Unit Requirements
T	78	
E	33	131
U	20	

Notes:
T (core courses) – compulsory courses for a particular area of specialisation that must be taken and passed.
E (elective courses) – courses must be taken by students with elective programme to strengthen their technology specialisation courses.
U (university requirements) – courses to fulfil the university requirements.

Details of Programme

Type of Programme	Structure of Programme
Bachelor of Food Technology with Elective	Students choose several elective courses to widen their specialisation area and their knowledge in industrial technology.

Graduation Requirements

- ☑ Fulfil the minimum required (8 semesters) of the residential requirement for the programme of study and has not exceeded the maximum period of study (14 semesters).
- ☑ Fulfil all credit requirements of the courses for the programme of study required units such as the requirements for each component (core, elective, and university courses or option).
- ☑ Obtained a CGPA of 2.00 and above for core courses.
- ☑ Obtained a CGPA of 2.00 and above for the programme.
- ☑ Achieved a minimum of 'C' or a grade point of 2.00 for Bahasa Malaysia, English (4 units), Malaysian Nation-State Appreciation, Philosophy and Current Challenges, and Core Entrepreneurship courses.

University Requirements for Graduation

LOCAL STUDENTS		INTERNATIONAL STUDENTS	
Compulsory Courses	**Units**	**Compulsory Courses**	**Units**
❖ LKM400/2 Bahasa Malaysia IV	2	❖ LKM100/2 Bahasa Malaysia I	2
English Language **(MUET Band 5.0 & above)** ❖ LHP Series (U) English Language **(MUET Band 4.0 & 4.5)** ❖ LSP301/2 General English 2 (Z) **and** ❖ LHP Series (U) English Language **(MUET Band 3.5 and below)** ❖ LSP201/2 General English 1 (Z) **and** ❖ LSP301/2 General English 2 (U)	2	English Language **IELTS 7.0 and above** **TOEFL iBT 80 and above** **PTE 64 and above** ❖ LHP Series (U) English Language **IELTS 5.5–6.5** **TOEFL iBT 41–79** **PTE 48–63** ❖ LSP301 (Z) **and** LHP Series (U) English Language **IELTS 5.0 and below** **TOEFL iBT 40 and below** **PTE 47 and below** ❖ LSP201 (Z) **and** LSP301 (U)	2
❖ HFF226/2 Philosophy and Current Challenges	2	❖ SHE103E/2 Malaysia Citra 1	2
❖ SHE102/2 Malaysian Nation-State Aspiration	2	❖ SHE104E/2 Malaysia Citra 2	2
❖ WAR122/2 Integrity and Anti-Corruption	2	❖ WAR123E/2 Integrity and Anti-Corruption	2
❖ WUS101/2 Core Entrepreneurship	2	❖ Co-curricular	2
❖ Co-curricular	2		
Optional Courses	**Units**	**Optional Courses**	**Units**
❖ Co-curricular/Skills Courses/Foreign Language Courses/Options ❖ WSU101/2 Sustainability: Issues, Challenges & Prospect ❖ HTV201/2 Thinking Techniques	6	❖ Co-curricular/Skills Courses/Foreign Language Courses/Options ❖ WSU101/2 Sustainability: Issues, Challenges & Prospect	8
Minimum Requirements	**20**	**Minimum Requirements**	**20**

Note: Student must pass all University courses with the minimum grade of C.

Curriculum Structure

COURSE TYPE	LEVEL 100 (2026/2027)				LEVEL 200 (2027/2028)				LEVEL 300 (2028/2029)				LEVEL 400 (2029/2030)			TOTAL UNIT
	SEMESTER 1	SEMESTER BREAK	SEMESTER 2	SESSION BREAK	SEMESTER 1	SEMESTER BREAK	SEMESTER 2	SESSION BREAK	SEMESTER 1	SEMESTER BREAK	SEMESTER 2	SESSION BREAK	SEMESTER 1	SEMESTER BREAK	SEMESTER 2	
CORE (T)	IMK103/2 IMK114/3 IUK107/4 IUK108/4 IUK191/4		IMA116/2 IMA117/2 IMG103/3 IMG111/3 IMK106/3		IMG203/3 IMG222/3 IMK225/3 IMK227/3		IMG204/3 IMG223/4		IMG324/4 IMG329/3 IMK316/3 IMK327/3		IMA325/3 IMK326/3		IMA422/4		IMA423/6*	78
	17		13		12		7		13		6		4		6	
ELECTIVE (E)**			IMK113/3		IBK104/3 IMK221/3		IMK209/2 IMK226/3 IMK228/2 IUK208/3		IBG214/4 IBK316/3		IMG328/3 IMK320/3 IUK292/3		IMK410/3 IMK424/2 IMK425/2 IUK190/3			33
			3		3–6		7–10		3–7		9		7–10			
UNIVERSITY (U)	WUS101/2 Ko-K/Option		LKM100/2 LKM400/2 WAR122/2 WAR123E/2 Ko-K/Option		LSP201/2 LSP301/2 LHP4xx/2 SHE102/2 SHE103E/2		HFF226/2 LSP201/2 LSP301/2 LHP4xx/2 SHE104E/2		LSP201/2 LSP301/2 LHP4xx/2 Ko-K/Option		LSP301/2 LHP4xx/2 Ko-K/Option		LHP4xx/2 Ko-K/Option			20
	2–3		0–4		0–4		0–4		4		2–4		2–4			
TOTAL MINIMUM CREDIT FOR GRADUATION																131

*Students must register for this course online during their internship.

**Students are eligible to enroll in elective courses throughout their four-year academic journey, accumulating a total of 33 units.

List and Synopsis of Courses

1. IBK104/3 Fundamentals of Bioprocess Technology

This course encompasses the definition of Bioprocess Technology, discussions of similarities and differences with the disciplines of Bioprocess Engineering and Biotechnology. The course also describes the existence of disciplines of Bioprocess Technology, a string of history of penicillin discovery, bioprocessing advantages over chemical processing, various bioprocessing products and basic knowledge as bioprocess technologists (cell diversity as catalyst agent, cell growth requirements, cell composition, enzymes and metabolic pathways). The diversification of cell growth reactors, monitoring and measurement of kinetic growth, multiple stages of processing of bioprocess product, Bioprocess Technology application in the treatment of animal and plant cell waste and culture. Students are also exposed to research areas in Bioprocess Technology.

2. IMA116/2 Persuasive Oral Presentation for Food Technology

Course Prerequisites: s IMK103/3

The course is basic skill requirement for a modern food technologist. It will include preparation and presentation of informative and persuasive speechees. Other topics include: selection and organization of material, methods of securing interest and attention, and the elements of delivery. The course will use food products as materials for presentation assignments.

3. IMA117/2 Basic Scientific Communication for Food Technology

Course Prerequisites: s IMK103/3

This course teaches students to read, extract and write research-based articles for professional communication of food sciences. The learning outcomes are designed to incorporate the overarching skills of critical thinking, effective communication, and the understanding of food science written communications.

4. IMG103/3 Food Chemistry

This course discussed the structure-function relationship of major food constituents such as water, carbohydrate, lipid, protein, vitamins, minerals and pigments. This course also will cover the effect of processing and preservation on the functional properties of the said constituents.

5. IMG111/3 Food Microbiology I

The course begins with an introduction to the field and history of microbiology. Topics to be discussed include the structure and function of prokaryotic and eukaryotic cells, microbial classification, physiology, genetics, microbial control by physical and chemical methods. Practical components include microscopy, culturing techniques, isolation, microbial identification and calculation.

6. IMK103/2 Introduction to Food Science and Technology

The course gives a comprehensive overview of food science and technology. The course introduces basic concepts relating to food composition, food nutritions, food preservation and processing, food deterioration, food safety, and food regulations. Ethical issues in food science and technology are briefly covered.

7. IMK106/3 Introduction to Food Engineering

This course introduces the fundamental of engineering principles and theory in food processing unit operations. This course covers introduction to the significance of food engineering in food processing operation, units and dimensions, basic thermodynamics, material and energy balance, heat and mass transfer, fluid flow and kinetics of chemical reactions.

8. IMK113/3 Management of Halal Food

This course introduces the basics of Islamic law related to halal food and food sources. The course also explains the methods of halal slaughter and halal food processing aspect. In addition, this course explains the standards related to halal products, halal management system, certification process, enforcement and related legislation. Current issues related to the misuse of the halal logo and halal food adulteration were also discussed.

9. IMK114/3 Introduction to Food Physics

This course covers basic Physics such as units and dimensions, vectors, Newton's Laws, work and energy, mass and density, geometric properties of foods, particle size and distribution, fluxes and also thermal, optical, acoustical and radioactivity properties. Examples of case studies and problems involving Physics in food systems will be discussed.

10. IUK107/4 Chemistry for Technologist

The course syllabus aims for a comprehensive coverage to bolster students' organic and general chemistry foundation. Topics include molecular structure, acidity and basicity, organic nomenclature, stereochemistry, synthesis, and reactions of diverse compounds. Spectroscopic methods will be taught for sample constituent and functional group identification.

11. IUK108/4 Statistic with Computer Applications

This course discusses basic statistical techniques, frequency tables, graph types, mean, variance and standard deviation. This course will also discuss various methods for analyzing data including Z test, T test, chi square test, Analysis of variance, linear correlation and linear regression. These analysis methods are also applied using computer software.

12. IUK190/3 Occupational Safety and Health Coordinator

The course provides student with the concepts and principles of occupational safety and health (OSH), and OSH management in suggesting justificable solutions.

13. IUK191/4 Mathematics I

This course introduces the concepts of functions and limits of a single variable. Linear, polynomial, logarithmic, exponential and trigonometry functions will be discussed. The focus will be on the understanding of concept and solving of differentiation and integration with applications. Students are then introduced to differential equations focusing on separable differential equation and first-order linear equations. Matrices and determinants are taught in solving systems of linear equations by using Gauss and Cramer methods.

14. IBG214/4 Enzyme Technology

This course covers properties and characteristics of enzyme, mode of reaction, reaction specificity. Source of enzyme, purification and characterization. Factors affecting enzyme reaction: temperature, pH, enzyme concentration, substrate concentration, end-product concentration, activator, inhibitor. Quantitation of enzyme reaction, enzyme kinetics. Enzyme immobilization techniques; immobilization mechanism; advantage and disadvantage of immobilized enzyme. Application of enzyme in food and non-food industries: milk industry, detergent.

15. IMG203/3 Chemical Food Analysis

Course Prerequisites: p IMG103/3

This course introduces the basic principles and procedures commonly used for food analysis. Protocol for sampling, analysis and data analysis to achieve valid measurement is emphasized. This course covers topics on proximate analysis for major food components and other minor components. Practical training for related experimental procedures will also be conducted.

16. IMG204/3 Instrumental Food Analysis

Course Prerequisites: p IMG103/3

This course introduces the principles and applications of instrumental methods in food analysis. It covers spectrochemical analysis methods, chromatographic methods, thermal analysis, and electrophoresis methods. In this course, instrumentation aspects and practical considerations for qualitative and quantitative analysis such as sample preparation and sources of error will be discussed.

17. IMG222/3 Food Microbiology II

Course Prerequisites: p IMG111/3

This course covers factors responsible for the selection of specific spoilage organism of different food commodities; microbiology of various food commodities, indicator organisms, microbiological criteria and sampling plans. Various foodborne pathogens are also discussed. The laboratory component covers microbiological examination of foods for both indicator and pathogenic organisms.

18. IMG223/4 Food Processing Technology of Animal-Based Products

Course Prerequisites: p IMG103/3

This course discusses the structure and composition of animal-based products. This course will also discuss the biochemical changes during postharvest and their effects on product quality. Processing technologies of animal-based products will be discussed. The effects of processing on product quality will also be reviewed.

19. IMK209/2 Physical Properties of Food

This course covers the study of the principles and measurement of various physical properties of foods that are important in handling, preparing, processing, preserving, packaging, storing and distribution of foods. The application of the underlying physical principles in food formulation and production will also be discussed.

20. IMK221/3 Food Ingredients

This course covers aspects of food ingredients and additives usually used in food products. Different catogeries of these ingredients and additives will be discussed based on their specific functional properties. Examples will be given such as chemical and trade name, E-number, properties, toxicology and suitable level of usage in food.

21. IMK225/3 Unit Operation in Food Processing

Course Prerequisites: p IMK106/2

This course will expose the students to the main topics in food process engineering operations. Topics covered include thermal processing, refrigeration, freezing, evaporation, drying, physical separation, size reduction, mixing, and non-thermal processing. Topic on food industry waste and wastewater treatment will also be discussed.

22. IMK226/3 Post Harvest Technology of Fruits and Vegetables

This is an advanced course of learning wherein, various aspects covering the “farm to table” theme will be discussed. The studying theme will include understanding post-harvest physiology and biochemical changes in fruits and vegetables, handling, transportation, and preservation/storage of the fresh harvest with emphasis laid on safety and quality evaluation.

23. IMK227/3 Biochemistry

This course covers the structure and functions of biomolecules, enzymes and various metabolism pathways. This course also covers gene expression and biochemical applications in the industry.

24. IMK228/2 Primary Products Technology

This course covers the chemistry and technology of two important commodities in Malaysia, namely, starch (with emphasis on sago starch) and commercial oils/fats (with emphasis on oil palm). Applications of relevant chemical and physical principles in food formulation and processing will be discussed.

25. IUK208/3 Experimental Design with Computer Applications

This course discusses on the Replication, Randomization, Blocking, and Definitions in Experimental Design (Experiment, Treatment, Factor, Level, Experimental unit, Experimental design, Random, Replicate).

26. IUK292/3 Introduction to Ergonomics and Ergonomic Trained Person

This course will introduce students to the concepts of ergonomics and and its applications in the industry. The coutse will also include topics covered in the competent programme of "ergonomic trained person".

27. IBK316/3 Food Bioprocess Technology

This course covers the processing of food commodities (plants and animals) via the usage of enzymes, tissue cultures and microorganisms, with the aim of increasing quality and the production of value-added products. The production of food ingredients and additives, as well as food processing aids through bioprocessing will also be discussed (eg probiotics, enzymes, coloring) The use of foods from genetically modified microbial sources will also be studied and issues on concerns and acceptance by the community/ masses will also be discussed.

28. IMA325/3 Food Product Development

This course covers main factors such as market survey, marketing strategy, development process, consumer behaviour and others in new food product development and also outlines methodologies for their management. Students will be required to work in groups to develop a prototype food product, to present a final report and to exhibit the final product to the public.

29. IMG324/4 Food Processing Technology of Plant-Based Products

This course provides an overview of various aspects and technologies involved in producing plant-based food products. This course will focus on the importance of various ingredients and processing steps on product safety and quality.

30. IMG328/3 Food Packaging

This course identifies the main packaging requirements for food products. It focuses on knowledge and application of the properties of commonly used packaging materials such as paper, metal, plastic, and glass, as well as food packaging related technologies.

31. IMG329/3 Sensory Science

Course Prerequisites: p IUK108/4

This course introduces methodology used in sensory evaluation of food products. Students will be exposed to the ability of humans to use their senses to evaluate the quality attributes of food products using sensory evaluation methods. This course covers the use of relevant statistics in analyzing sensorial evaluation data.

32. IMK316/3 Food Quality Management and Food Regulations

This course introduces quality management system that is widely practiced in the food industry. This course covers food assurance, control, evaluation and audit. The course is made complete with basic exposure to food laws and regulation.

33. IMK320/3 Functional Foods

This course covers the science, technology, regulatory aspects, and product design and development of functional foods (foods rendering health benefits). Students will be taught in detail on various aspects relevant to plant- and animal-based functional foods and their economic importance.

34. IMK326/3 Food Safety

Course Prerequisites: p IMG111/3 & p IMG222/3

This course focuses on practices that will ensure production, processing and preparation of safe foods. Topics covered are type of contaminants, types of soils and their interaction with contact surfaces; various cleaning operations; election, application and safety of detergents and sanitizers; Code of Food Hygiene; Food safety management tools such as GMPs/HACCP, risk management, food toxicology and food allergens will also be covered in this course.

35. IMK327/3 Human Nutrition

This course discusses the sources of nutrient in food, functions of nutrient in metabolic processes, nutritional deficiencies and its relationship to health. This course will also introduce the fundamental of nutritional status assessment, energy requirements, and relationship between nutrition and disease.

36. IMA422/4 Food Technology Research Project

Course Prerequisites:

(i) Students must take all core courses of levels 100, 200, and 300.

(ii) Students have collected at least 50 credit units of core courses.

This course will introduce the student problems relating to Food Technology. Through research, the student will be tasked to solve the problem. Lecturers will supervise the students in carrying out research proposal writing, literature search, laboratory work, thesis/dissertation writing, and viva voce. The student will also attend a series of lectures on experimental design, laboratory safety, thesis/dissertation, presentation etc.

37. IMA423/6 Food Industrial Training

Course Prerequisites: Students have completed SEVEN (7) semesters of study, regardless of the accumulated units.

This course involves placement of students to undertake internship at industries. During the internship, students are able to gain an insight into industrial practices and appreciate how principles of science, technology and management are applied in the actual workplace.

38. IMK410/3 Food Borne Pathogens

Course Prerequisites: p IMG111/3 & p IMG222/3

The course covers incidence, trends, epidemiology, nature of illness, growth characteristics and current detection, prevention and control methods of both traditional and emerging foodborne pathogens (bacteria and their toxins, viruses, and parasites). Outbreaks of recent foodborne illness and their investigations will also be discussed.

39. IMK 424/2 Food Defence

This course highlights the importance of ensuring the right food defense plans are in place. Topics covered include vulnerability assessments and mitigation strategies. This information will be useful in building a food defense plan. Students will be exposed to the requirements, guidelines, and tools to develop a food defense plan.

40. IMK 425/2 Food Structure

This course relates food structure with molecular composition, processing and macroscopic properties. It involves food structure stability, techniques of analyzing food structure i.e. rheological and physical properties, microscopic imaging and relationship between structure and senses. Students will design and conduct their own projects to ehance their understanding of food structure.

Expertise

No.	Name	Expertise & USM Expert Link
1	Prof. Dato' Dr. Azhar bin Mat Easa	1. Protein-Nutrient Interactions 2. Functional Foods 3. Almost-Illegal Foods USM Expert: https://experts.usm.my/cvitae/azhar
2	Assoc. Prof. Dr. Cheng Lai Hoong	1. General Food Processing - Industrial Problems Solving 2. Product shelf life 3. Food Quality USM Expert: https://experts.usm.my/cvitae/lhcheng
3	Assoc. Prof. Dr. Lee Lai Kuan	1. Human Nutrition 2. Nutritional Biochemistry 3. Nutrigenomic 4. Food Security 5. Biostatistic 6. Human Clinical Trial USM Expert: https://experts.usm.my/cvitae/l.k.lee
4	Assoc. Prof. Dr. Tan Thuan Chew	1. Food Regulations 2. Kinetic Study 3. Beverage Processing and Technology 4. Alternative Proteins 5. Food Defense 6. Food Fraud USM Expert: https://experts.usm.my/cvitae/thuanchew
5	Dr. Uthumporn Utra @ Sapina Abdullah	1. Food Chemistry and Analysis 2. Starch Structure and Functionality 3. Functional Food Product USM Expert: https://experts.usm.my/cvitae/sapina

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6	Dr. Abdorreza Mohammad Nafchi	1. Textural, Rheological, and Thermal Properties of Foods 2. Bionanocomposites and Smart Packaging 3. Food Plant Layout 4. Simulation and Optimization of Food Processing Lines USM Expert: https://experts.usm.my/cvitae/amohammadi
7	Dr. Effarizah binti Mohd Esah	1. Microbiological Food Safety 2. Molecular Microbiology 3. Bacterial Foodborne Pathogens USM Expert: https://experts.usm.my/cvitae/effarizah
8	Dr. Hayati binti Samsudin	1. Food Packaging 2. Biodegradable Polymers 3. Mass Transfer in Food Packaging Application USM Expert: https://experts.usm.my/cvitae/hayatis
9	Dr. Maizura binti Murad	1. Food Sensory Evaluation 2. Food Analysis 3. Halal Food Management USM Expert: https://experts.usm.my/cvitae/maizura
10	Dr. Musfirah binti Zulkurnain	1. Edible Oil Applications Technologies 2. Structuring Fatty Food Systems 3. Fats & Oils Processing Technologies 4. Non-Thermal Processing Technologies USM Expert: https://experts.usm.my/cvitae/musfirah.z
11	Dr. Nor Shariffa binti Yussof	1. Food Bioploymers and Colloids 2. Food Nanotechnology 3. Lipid Technology USM Expert: https://experts.usm.my/cvitae/nshariffa
12	Dr. Norazatul Hanim binti Mohd Rozalli	1. Food Processing and Engineering 2. Heat and Mass Transfer in Food Processing 3. Food Rheology 4. Kinetic Analysis USM Expert: https://experts.usm.my/cvitae/norazatulhanim

No.	Name	Expertise & USM Expert Link
13	Dr. Norlia binti Mahror	1. Food Microbiology 2. Mycology 3. Mycotoxins USM Expert: https://experts.usm.my/cvitae/norlia.mahror
14	Dr. Syahariza binti Zainul Abidin	1. Food Chemistry and Analysis 2. Texture-Modified Food 3. Starch Structure-Digestibility Study 4. Halal Food Authentication USM Expert: https://experts.usm.my/cvitae/syahariza

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