Course Syllabus (Academic Year 2022)

School of Interdisciplinary Studies, Kanchanaburi Campus, Mahidol University

1. **Course No. and Title** : KAFT342 Food Microbiology I

   Credit (study hours)   : 3(2-3-5)

2. **Program Name**   : Bachelor of Science in Food Technology

3. **Course Module**   : Specific Core Course, Required Subject

   Pre/co-requisite   : KAFT 242 and KAFT244 (general microbiology lecture and lab)

4. **Class Semester**   : ☑ 1st Semester   Academic Year 2022

5. **Class Schedule & Venue** : Lecture on Tuesday at 10:00 – 12:00 Lecture Room: L216

   Laboratory room : L103

   Laboratory on Tuesday at 13:00-16:00, Room L103 at laboratory building

6. **Class Coordinator**   : Asst. Prof. Dr. Natteewan Udomsil Room : L217

   Contact No. 081-7249641 or 2506 Email: paeng888@hotmail.com

7. **Course Description**

   The role of microorganisms in food processing and preservation; food contamination and spoilage; foodborne disease; food production using microorganism for healthy food; microbiological techniques for identification and quantification of bacterial contamination in various kind of food products; utilization of resources effectively

8. **Course Objectives / Course Learning Outcomes (CLOs)**

No.	Objectives / CLOs	Expected Skills / Knowledge***			PLOs
		Specific	Generic	Knowledge	
8.1	Explain roles of microorganism that associate in food fermentation, food spoilage, food pathogen and parasite in food.	S2,3	G1,4,10	K7,8,9	1
8.2	Demonstrate microbiological technique skill and select appropriate methods for pathogen detection in food.	S2,3,5,6,8	G1,2,4,7,10, 13	K5,7,8,9,25	2
8.3	Demonstrate the use of communication skill and show cooperative teams	-	G10, G14	K8, K25	5

Note: * S1: Skill in selecting appropriate raw material for food production; S2: Skill in controlling food production process; S3: Skill in identifying problem occurred during food process; S4: Skill in providing alternative solution in food production process; S5:

Skill in identify important characteristics of food; S6: Skill in selecting appropriate analytical techniques; S8: Skill in judging food quality based on provided data

G1: Decision making; G2: Information acquisition; G3: Ethics; G4: Associating skill; G5: Business awareness; G6: Cultural awareness; G7: Time management; G8: Computer skill/IT; G9: Problem solving; G10: Communication skill; G11: Leadership; G12: Live-long learning; G13: Writing skill; G14: Presentation skill; G15: Interpersonal skill; G16: Teamwork; G17: Self-direction

K1: Post harvest handling of agricultural materials; K2: Food chemistry; K3: Food processing; K4: Food biochemistry; K5: Food laws/std. regulations (HACCP); K6: Food engineering; K7: Food safety; K8: Food microbiology; K9: QC&QA (Stat. for QC); K10: Food sanitation; K11: Logistic; K12: Sustainability; K13: Waste management; K14: Global& national trend & policy; K15: Business administration; K16: Physical properties of food; K17: Analysis of food properties; K18: Sensory; K19: Shelf-life estimation; K20: Stat. (sampling); K21: Stat. (data analysis); K22: Experimental design; K23: Scientific writing; K24: Scientific presentation (media preparation); K25: Thai language for communication; K26: English language for communication; K27: Psychology K28: Human nutrition

** **PLO1**: Apply knowledge and skill of food technology and related fields to work in a role of food technologists in food industries for producing safe foods that also meet standards.

PLO2: Analyze basic food qualities using appropriate laboratory techniques following good practice with moral and utilization of laboratory resources effectively.

PLO3: Conduct research in food technology for problem solving or product developing following the change in terms of economy, society and environment–at the local level, national level or global level—using appropriate scientific research methodology, working with good ethics, and expressing the desire to develop better research.

PLO4: Able to communicate both verbally and literally in Thai and English to different levels of audience as a role of food technology effectively using appropriate methods.

PLO5: Demonstrate to work as in a team both as a leader and a member of the group effectively for promoting good co-operation.

9. **Class Instructor List**

   9.1 Name : Asst. Prof. Dr. Natteewan Udomsil (NU)   Email : paeng888@hotmail.com

   9.2 Name : : Dr. Amnat Jarerat (AJ)   Email : amnat.jar@mahidol.edu

   9.3 Name : Dr. Supatra Chunchob (SC)   Email : supatra191@yahoo.com

10. **Course Outline**

    10.1 Lecture section

Week	Date	Contents	CLOs	Teaching & Learning	Instructor's Names
1	9/08/22	Course Introduction Basic Microbiology	8.1	Lecture and discussion	NU
2	16/08/22	Factors influence microorganisms in food	8.1		NU
3	23/08/22	Indicator organisms	8.1		NU
4	30/08/22	Microbial spoilage	8.1		NU
5	6/09/22	Foodborne pathogenic bacteria	8.1		AJ

		-*Staphylococcus aureus* -*Listeria monocytogenes*			
6	13/09/22	Foodborne pathogenic bacteria -*Bacillus* sp. -*Clostridium* sp.	8.1		AJ
7	20/09/22	Foodborne pathogenic bacteria -*Campylobacter* sp. -*Aeromonas hydrophila* -*Plesimonas shigelloides*	8.1		AJ
8	27/09/22	Foodborne pathogenic bacteria -*Shigella* sp. -*Salmonella* sp. -*Vibrio* sp.	8.1		AJ
9	Mid-term examination (3rd -7th October 2022)				
10	11/10/22	Identification of Foodborne pathogenic bacteria	8.1		NU
11	18/10/22	Microorganisms for food fermentations	8.1		NU
12	25/10/22	Advance techniques for detection of foodborne pathogen and commercial tests	8.1	Lecture and discussion	NU
13	1/11/22	Foodborne fungi, virus and mycotoxin	8.1		NU
14	8/11/22	Foodborne and waterborne parasite	8.1		SC
15	15/11/22	Advance rapid method by 3M	8.1		3M company
16	22/11/22	Term paper	8.3	Group assignment	
17	Final Examination (29th November – 10th December 2021)				

Note: -

10.2 Laboratory section

Week	Date	Contents	CLOs	Teaching & Learning	Instructor's Names
1	9/08/22	Safety and principle practice in microbiology lab	8.2	Laboratory experiment	NU
2	16/08/22	Sample preparation, Media preparation, Microscopic techniques	8.2		NU, KP
3	23/08/22	Standard plate count, Yeast and Mold count Pour plate and Spread plate techniques	8.2		NU, KP
4	30/08/22	**Microbiological standard technique test**	8.2	Practical examination	NU, AJ, KP
5	6/09/22	Detection of *Staphylococcus aureus* in food sample	8.2	Laboratory experiment	AJ, KP
6	13/09/22	Detection of *Listeria monocytogenes* in food sample	8.2		AJ, KP
7	20/09/22	Detection of *Bacillus cereus* in food sample	8.2		AJ, KP
8	27/09/22	Detection *Salmonella* sp. In food sample	8.2		AJ, KP
9		Midterm examination (4th -8th October 2021			
10	11/10/22	Detection of *Vibrio* sp. In food sample	8.2	Laboratory experiment	AJ, KP
11	18/10/22	Bacterial cellulose production by *Acetobacter xylinum*	8.2		NU, KP
12	25/10/22	Detection of Coliforms and *E.coli* in food sample	8.2		NU, KP
13	1/11/22	**Identification and detection of unknown pathogen in food**	8.2	Practical examination	NU, KP
14	8/11/22	Foodborne and waterborne parasite	8.2	Laboratory experiment	SC, KP
15	15/11/22	Bacterial detection using 3M-petrifilm	8.2	Laboratory experiment	3M company & NU
Final Examination (29th November – 10th December 2021)					

Note: -

11. Course Assessment

No.	Methods / Activities	Regulations	CLOs	Week	Weight Distribution (%)
11.1	Mid-term exam	Writing exam	8.1, 8.2	9	30
11.2	Final exam	Writing exam	8.1, 8.2	16	30
11.3	Microbiological technique test and pathogen identification	Aseptic technique skill, correct methods and results	8.2	4,13	15
11.4	Lab reports	Rubric	8.2, 8.3	15	10
11.5	Term paper	Rubric	8.3	15	15
				Total	100

12. Grading System

☑ Criterion-referenced evaluation

Grade	Score	Grade	Score	Grade	Score	Grade	Score
A	$\geq 80\ \%$	B	70 – 74.99%	C	60 – 64.99%	D	50 – 54.99%
B+	75 – 79.99%	C+	65 – 69.99%	D+	55 – 59.99%	F	< 50 %

☐ Norm-referenced evaluation

*If use both criterion and norm-referenced evaluation, please tick two boxes.

13. References

13.1 Food and Drug Administration. 2001. Bacteriological Analytical Manual 9th edition.

13.2 Heyes, P. R. 1992. Food Microbiology and Hygiene 2nd edition. Elsevier Science Pub.

13.3 Mclandsborough, Lynne Ann.. Food Microbiology Laboratory. CRC press. 2003