

COURSE SYLLABUS AND ASSESSMENT TOOLS

FST332 CHARACTERISTICS OF FOOD MATERIALS

Credit	: 3 (3-0) (3 hours lectures and discussions per week for 14 weeks; no laboratory work)
Semester	: 5
Academic Year	: 2011/2012
Pre-requisite	: Food Chemistry (FST210) and Food Microbiology (FST220)
Number of students	: 110, divided into two parallel classes (55 students per class)
Delivery Method	: Lecture, class discussion, writing process (paper preparation), and oral presentation
Course Coordinator	: Sugiyono
Contact	: 62-251-8626725; 08121318058
Lecturers	: 1. Sugiyono (ssugiyono@yahoo.com.au) 2. Joko Hermianto (johoher@yahoo.com) 3. Dede R. Adawiyah (dede_adawiyah@yahoo.com) 4. Nugraha E. Suyatma (nugrahaedhi@yahoo.com)
Day and Time	: Friday, 01.00 - 03.30 pm
Classrooms	: H101 (Parallel class 1); SEAFast Center (Parallel class 2)

I. Course Description

This course covers physicochemical, sensory, microbiological and physiological characteristics of food materials from plant and animal origin as well as functional properties of food ingredients commonly used in food processing.

II. General Learning Outcomes

Upon successful completion of this course the students are expected to have learned the physicochemical, microbiological and physiological characteristics of food materials from plant and animal origins and food ingredients. In relation to learning outcomes recommended in IFT education standard, after completing this course students are expected to have learned:

1. The source and variability of raw food material and their impact on food processing operations.
2. The relationship of food characteristics to major chemical reactions of food components that influence food quality
3. Safety and shelf-life as well as the current topics related to food materials and ingredients in food industries.

This course also contributes to the improvement of student's success skills, especially in oral presentation skills, critical thinking skills, interaction skills, information acquisition skills and organizational skills.

III. Specific Learning Outcomes

Upon successful completion of this course students will be able to:

1. Describe the variability of food materials and ingredients in terms of physicochemical, microbiological and physiological characteristics (C2, comprehension).
2. Describe and compare the characteristics of various fruits and vegetables and their products (C2-C4, comprehension-analysis).
3. Describe and compare the characteristics of various cereals and their products (C2-C4, comprehension-analysis).
4. Describe and compare the characteristics of various roots and tubers and their products (C2-C4, comprehension-analysis).
5. Describe and compare the characteristics of various legumes and nuts and their products (C2-C4, comprehension-analysis).
6. Describe and compare the characteristics of various oil and fat sources and their products (C2-C4, comprehension-analysis).
7. Describe and compare the characteristics of natural and synthetic sweeteners and their products (C2-C4, comprehension-analysis).
8. Describe and compare the characteristics of herbs and spices, seasonings and their products (C2-C4, comprehension-analysis).
9. Describe and compare the characteristics of tea, coffee, and cacao and their products (C2-C4, comprehension-analysis).
10. Describe and compare the characteristics of meat and its products (C2-C4, comprehension-analysis).
11. Describe and compare the characteristics of milk and its products (C2-C4, comprehension-analysis).
12. Describe and compare the characteristics of egg and its products (C2-C4, comprehension-analysis).
13. Describe and compare the characteristics of fish and its products (C2-C4, comprehension-analysis).
14. Correlate the physicochemical characteristics of food materials and ingredients to the quality, safety and shelf-life of food products (C4, comprehension).
15. Correlate the chemical reactions in foods during processing and storage to the characteristics of food materials and ingredients (C4, comprehension).
16. Select food materials and ingredients suitable for food development and processing according to their physicochemical, microbiological and physiological characteristics (C6, evaluation).

IV. Textbooks and Lecture Notes

A. Textbooks

1. Codex Alimentarius Commission. Food Category.

2. Murano,P.S. 2003. Understanding Food Science and Technology. Thomson Wadsworth, USA.
3. Potter,N.N. and Hotckiss,J.H. 1995. Food Science. Chapman and Hall, New York.

B. Lecture Notes

Available in form of printed out of power point presentation.

V. Course Outline

Week	Topic	Sub-topics	Lecturers*
1	Fruits and Vegetables, and their Products	<ul style="list-style-type: none"> • Physical and sensory characteristics • Chemical characteristics • Microbiological characteristics • Functional properties • Post-harvest physiology • Characteristics of fruit and vegetable products 	DRA
2	Cereals and their Products	<ul style="list-style-type: none"> • General physical structure and chemical composition • Rice (physical structure, chemical composition, post-harvest handling, rice products) • Corn (physical structure, chemical composition, post-harvest handling, rice products) • Wheat (physical structure, chemical composition, post-harvest handling, rice products) • Sorghum, barley, oat 	SUG
3	Roots and Tubers, and their Products	<ul style="list-style-type: none"> • Cassava (physical structure, chemical composition, post-harvest handling, cassava products) • Sweet potato (physical structure, chemical composition, post-harvest handling, sweet potato products) • Potato ((physical structure, chemical composition, post-harvest handling, potato products) • Other minor roots and tubers 	SUG
4	Legumes and their Products	<ul style="list-style-type: none"> • Soybean ((physical structure, chemical composition, post-harvest handling, soybean products) • Peanut ((physical structure, chemical composition, post-harvest handling, peanut products) • Mungbean ((physical structure, chemical composition, post-harvest handling, 	SUG

Week	Topic	Sub-topics	Lecturers*
		<ul style="list-style-type: none"> mungbean products) • Other minor legumes 	
5	Fats and Oils, and their Products	<ul style="list-style-type: none"> • Fat and oil source • General characteristics of fats and oils (chemical properties, functional properties, products) • Palm oil, coconut oil, oil and fat products • Fat imitation and fat substitutes • Fat deterioration 	DRA
6	Sugar and Sweeteners, and their Products	<ul style="list-style-type: none"> • Classification and sources • Sucrose, glucose, invert sugar, fructose, alcohol sugars, synthetic sweeteners • Sugar in food processing 	DRA
7	Spices and Herbs, and their Products	<ul style="list-style-type: none"> • Definition • Post-harvest handling • Some spices and herbs • Products of spices and herbs 	DRA
8	Tea, Coffee, and Cacao, and their Products	<ul style="list-style-type: none"> • Coffee (physical structure, chemical composition, post-harvest handling, coffee products) • Tea (physical structure, chemical composition, post-harvest handling, tea products) • Cacao (physical structure, chemical composition, post-harvest handling, cacao products) 	DRA
8-10	Meat and its Products	<ul style="list-style-type: none"> • Physical structures • Chemical composition • Post-mortem physiology • Microbiological characteristics • Post-mortem handling • Meat products 	JHE
11-12	Milk and its Products	<ul style="list-style-type: none"> • Chemical composition • Post-harvest physiology • Microbiological properties • Post-harvest handling • Milk products 	JHE
13	Egg and its Products	<ul style="list-style-type: none"> • Physical structures • Chemical composition • Post-harvest physiology • Microbiological properties • Post-harvest handling • Egg products 	NES
14	Fish and its Products	<ul style="list-style-type: none"> • Physical structures • Chemical composition 	NES

Week	Topic	Sub-topics	Lecturers*
		<ul style="list-style-type: none"> • Post-mortem physiology • Microbiological properties • Post-mortem handling • Fish products 	

*Note: SUG (Sugiyono), DRA (Dede R. Adawiyah), JHE (Joko Hermanianto), NES (Nugraha E. Suyatma)

VI. Potential Course Overlap

There are some minor overlapping with other related courses such as Food Chemistry (FST210), Food Microbiology (FST220), Principles of Food Processing (FST 231), and Food Processing Technology (FST333). The overlap topics are intended to show the relation among those courses.

VII. Assessment Tools

A. Quizzes

Four quizzes will be delivered during lectures without pre-announcement. In each quiz, 4-5 short answered questions are given during class period. The questions cover the previous lecture topics. The maximum score of each quiz is 100.

B. Midterm and Final Written Examinations

1. Mid and final written examinations will be held during examination period scheduled by the Registrar's office. Look at the examination schedule on the announcement board.
2. The middle and final examinations will cover course topics delivered in week 1-7 and 8-14, respectively.
3. Each written examination will be composed of 60 objective questions (multiple choice and true-false questions) and essay questions. Time allocation: 90 minutes. Maximum scores: 100.
4. Dishonesty or cheating during examination, such as obtaining or receiving illegal help or obtaining unauthorized information about an examination beforehand will result in the failure of the course. Disciplinary actions will be imposed if a student is found to have seriously violated any of the rules contained in the Code of Conduct: warning, reduction of grades, suspension or expulsion.
5. Scores will be posted on the announcement board soon after exam papers are graded.
6. Here are some examples of essay questions at different cognitive levels:

Example 1 (C1, Knowledge)

Which component in soybean that plays role as an emulsifier?

Example 2 (C2, comprehension)

Describe the changes of fruit pectin during fruit maturation process?

Example 3 (C3, application)

Which component of starch that contributes to the stickiness of rice? Explain your answer!

Example 4

If you are an R&D staff will use starch as thickener in pudding. You have two alternatives of starch: sago starch (amylose content: 16%) and rice starch (amylose content: 25%). Answer the following questions:

- (a) What is the difference between two types of starch suspension when cooked (C4, analysis)?
- (b) What is the important starch characteristic that is suitable for pudding? (C5, synthesis)
- (c) Which starch will you select? Explain your answer (C6, evaluation)

The following are additional examples of multiple choice questions:

Example 5 (C1, knowledge)

Fruits produce the following compound, which aids in the ripening process:

- (A) galacturinic acid
- (B) ethylene
- (C) oxygen
- (D) salt
- (E) urea

Example 6 (C2, comprehension)

The cassava root toxin is produced by the breakdown of _____ by _____ enzymes

- (A) cyanohydrin, beta glucosidase
- (B) cyanogenic glycoside, cyanohydrin
- (C) glycoside compound, two
- (D) HCN, beta glucosidase
- (E) lyase, HCN

Example 7 (C6, evaluation)

Bananas are climacteric fruits; therefore:

- (A) they demonstrate maximum respiration rate before harvest
- (B) the best time to harvest is before they are fully ripe
- (C) they do not continue to ripen after harvest
- (D) minimum respiration rate is achieved after harvest, just before ripening
- (E) the best time to harvest is after they are fully ripe

C. Group Assignment: Oral Group Presentation

1. This task is designed to improve student's success skills as well as their understanding regarding the application of food materials and ingredients in food processing.
2. The class is divided into 6 groups. Each group must prepare a power point presentation of course-related topic. Select a specific food commodity or product. Focus on its special characteristics such as physical, chemical, microbiological, physiological, sensory, or functional properties. Discuss the topic in your group.
3. Once you select a specific characteristic of food commodity or product, search scientific literatures (textbook, journal, internet, etc.) and make a power point presentation in English.

4. Discuss the presentation material in your group. The presentation material should consist of title, introduction, the specific characteristics of food commodity or product, conclusion, and references.
5. Oral presentation is conducted in week 7 and 14. One or two students in each group will present orally the selected topics in Bahasa Indonesia for approximately 10 minutes.
6. After presentation, discussion session is provided for 5 minutes. All member of presenting group must be active to answer questions or comments.
7. Scoring of presentation is conducted using the following rubric :

Criteria	Excellent (85-100)	Strong case (71-84)	Capable (61-70)	Developing (50-60)	% of Total Score
Introduction	The background is stated clearly. Purpose well stated.	Background is understandable. Purpose not clearly stated.	A weak background presented. Purpose incomplete or vague.	Background not presented in a logical manner. Purpose missing.	15
The specific characteristics of food commodity or product	Scientific literatures (textbooks, journals) are cited clearly and correctly interpreted with insightful connection to topics discussed	Textbooks are cited clearly. No journal is cited and correctly interpreted	Literatures are cited unclearly and incompletely. No clear author of literature cited	No scientific papers/ textbooks/other sources is cited. Information is unclear, not accurate or misinterpreted	30
Conclusion	Statement draws a conclusion that is supported by strong supporting evidence for the conclusion. Clear connection with overall topic discussed	Statement draws a conclusion that is supported by the evidence for the conclusion	Statement draws a conclusion but fails to show any evidence for the conclusion.	No any conclusion stated related to the topic discussed	15
References	Used many and varied	Used more resources than	Used inadequate	No reference or citation	10

Criteria	Excellent (85-100)	Strong case (71-84)	Capable (61-70)	Developing (50-60)	% of Total Score
	sources; followed a journal guideline consistently	required, followed a journal guideline consistently	number of sources; inconsistent style		
Presentation materials	Concise, very clear, good illustration, interesting, proper animation	Generally good, interesting, no illustration or animation	Fairly good, no illustration or animation	Required improvement	15
Presentation performance (time management, topic substance mastering, self confidence)	Good time management, mastering topic very well, very self confident.	Good time management, mastering topic, self confident.	Fairly time management, fairly mastering topic, fairly very self confident.	Bad time management, not mastering topic, not very self confident.	15

VIII. Grading

Five grades will be applied, i.e. A, AB, B, BC, C, D, and E. Grades of students are determined according to their final score. The final score (FS) are calculated as follows:

$$FS = 40\% \text{ midterm exam} + 40\% \text{ final exam} + 10\% \text{ quizzes} + 10\% \text{ group assignment}$$

FS is transformed into five grade classification as follows:

Final grade classification:

A \geq 80; AB: 75-79; B: 70-74; BC: 65-69; C: 55-64; D: 45-54; E < 45

**Assessment Tools to Measure the Achievement of Learning Outcomes
in Characteristics of Food Materials Course (FS332)**

Code : FST 332
Course : Characteristics of Food Materials
Credit : 3(3-0)

Code	Learning Outcomes	Topics Covered in this Course	Cognitive Levels	Assessment Tools
I.A.1.	understand the chemistry underlying the properties and reactions of various food components (cover in some extent)	Chemical composition of food materials and ingredients and potential chemical reactions during processing	C1-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
I.B.1.	have sufficient knowledge of food chemistry to control reactions in foods (cover in some extent)	Chemical composition of food materials and ingredients and potential chemical reactions during processing	C1-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
I.B.2.	understand the major chemical reactions that limit shelf life of foods (cover in some extent)	Potential chemical reactions due to component interaction and processing effect responsible to limit product shelf-life	C1-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
II.C.1.	understand the role and significance of microbial inactivation, adaptation and environmental factors (i.e., A_w , pH, temperature) on growth and response of micro-organisms in various environments (cover in detail)	Physicochemical and microbiological characteristics of food materials in relation to potential microbiological growth	C1-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
III.A.1.	understand the source and variability of raw food material and their impact on food processing operations (cover in detail)	All topics in week 1-14	C2-C6	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
III.B.1.	know the spoilage and deterioration mechanisms in foods and methods to control deterioration and	Physicochemical and microbiological characteristics of food materials in relation to spoilage and	C2-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral

Code	Learning Outcomes	Topics Covered in this Course	Cognitive Levels	Assessment Tools
	spoilage (cover in some extent)	deterioration mechanism		presentation
III.B.2.	understand the principles that make a food product safe for consumption (cover in some extent)	Effect of processing to inactivate microorganisms in order to produce safe food products	C2-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
IV.D.1.	be able to apply the principles of food science to control and assure the quality of food products (cover in detail)	Effect of food materials and ingredients characteristics to food product quality	C3-C4	<ul style="list-style-type: none"> • Written examination • Quiz • Oral presentation
IV.F.1.	be aware of current topics of importance to the food industry (cover in detail)	The importance of food materials and ingredients in the perspective of food industry	C3-C6	Oral presentation
VI.A.1.	demonstrate the use of oral and written communication skills (cover in detail)	Group assignment: application of food materials and ingredients in food processing		Oral presentation
VI.B.1.	define a problem, identify potential causes and possible solutions, and make thoughtful recommendations (cover in some extent)	Group assignment: application of food ma		Oral presentation
VI.C.1.	commit to the highest standards of professional integrity and ethical values (cover in detail)	Course rules		Oral presentation
VI.E.1.	work effectively with others (cover in detail)	Group assignment: application of food ma		Oral presentation
VI.E.2.	provide leadership in a variety of situations (cover in some extent)	Group assignment: application of food ma		Oral presentation
VI.E.3.	deal with individual and/or group conflict (cover in some extent)	Group assignment: application of food ma		Oral presentation

Code	Learning Outcomes	Topics Covered in this Course	Cognitive Levels	Assessment Tools
VI.F.1.	independently research scientific and non-scientific information (cover in detail)	Group assignment: application of food ma		<ul style="list-style-type: none">• Oral presentation
VI.F.2.	competently use library resources (cover in detail)	Group assignment: application of food ma		<ul style="list-style-type: none">• Oral presentation
VI.G.2.	facilitate group projects (cover in detail)	Group assignment: application of food ma		<ul style="list-style-type: none">• Oral presentation