Subject Description Form

Subject Code	ABCT3413
Subject Title	FOOD PROCESSING I
Credit Value	3
Level	3
Pre-requisite	Elements of Food Engineering (ABCT3403)
Co-requisite	Nil
Exclusion	Nil
Objectives	The objective of this subject is to provide students with the knowledge of spoilage and deterioration mechanisms in foods, basic food preservation principles, and processing methods to control food spoilage and deterioration. Various background disciplines in chemistry, microbiology, and process technology will be integrated into the study of this subject.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. gain appreciation of the fundamental principles of food spoilage, food preservation and processing methods that make a food safe for consumption; b. assess the storage stability of food products; c. apply the principles of food preservation and processing to solve practical, real-world problems; d. integrate knowledge of microbiology, chemistry, and engineering principles to solve problems in food preservation and processing.
Subject Synopsis/ Indicative Syllabus	<u>Principles of Food Spoilage and Preservation:</u> Important parameters of foods that affect their stability; causes of food spoilage; microorganisms, enzymatic reactions and chemical changes in foods; the aim, principles and methods of food preservation. <u>Thermal Processing:</u> Heat resistance and kinetics of microbial cells and bacteria spores; Thermal-Death-Time curves; commercial sterility and 12D concept; commercial thermal processing and equipment: blanching, pasteurization, sterilization, aseptic UHT processing. <u>Chilling & Freezing:</u> Effect of low temperature on microbial activity, enzymatic activity and rate of chemical changes; behavior of foods at chilling temperatures; nucleation and crystallization; freezing curves; calculation of chilling and freezing time; system and equipment for chilling and freezing. <u>The Control of Water Activity</u> Principles of water activity as related to microbial spoilage, chemical and enzymatic reactions, and physical stability of foods. <u>Dehydration:</u> Pychrometry and principles of drying; mass and heat balance in air drying; drying curves; calculation of drying rates; factors affecting drying rates; industrial food dehydration methods and equipment; freeze drying; quality and

	stability of dehydrated foods. <u>Separation and concentration:</u> The theory, equipment and applications of centrifugation, filtration, extraction, freeze concentration and membrane concentration for food industry. <u>Other methods of food preservation/processing</u> Irradiation; chemical preservation; pickling of fruits and vegetables; meat curing and processing; concept of hurdle technology.
Teaching/Learning Methodology	Lectures with guided reading are designed to cover the main theme of the subject matter. Various background disciplines of microbiology, chemistry and physics are integrated into the study of food preservation. Review exercises are designed to assess students' understanding of the subject matters and to facilitate discussion in tutorials. Blackboard is used for the dissemination of subject materials, enhancing communication, and providing timely feedback to students. **Laboratory experiments** on food processing will be performed by students to improve their understanding of the principles and their problem-solving ability (Suggested experiments: Double-pipe heat exchanger; Fluid flow unit; Measurement of fluid viscosity and rheology).
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Course work	35	√	√	√	√		
2. Lab work	15	√	√	√	√		
3. Final exam	50	√	√	√	√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assignments, test and final exam are used to assess all the outcomes.

Student Study Effort Expected	Class contact:	
	▪ Lecture	24 Hrs.
	▪ Tutorial	5 Hrs.
	▪ Laboratory	15 Hrs
	Other student study effort:	
	▪ Assignment	20 Hrs.
	▪ Self-study	48 Hrs.
	Total student study effort	107 Hrs.

Reading List and References	Essential		
	Fellows, P.J.	Food Processing Technology: Principles and Practice (4th ed)	Woodhead 2017
	Supplementary		
	Zeuthen, P. (Ed.)	Food Preservation Techniques	Woodhead 2003
	Rahman, M.S. (Ed.)	Handbook of Food Preservation (2nd ed)	CRC Press 2007
	Marcus, K. and Lund, D. B.	Physical Principles of Food Preservation	CRC Press 2003